Over 25 Color Computer Programs

August 1982
USA $2.95 (UK £1.60)

80micro®

A WAYNE GREEN PUBLICATION

the magazine for TRS-80 users*

Arcade

40 Games 40

**The Readers' Choice Awards—
Vote for Your Favorite Software**

"They shouldn't have touched my Dosplus"

"I only left my keyboard for a few minutes ...when I returned, I found Stamitz from accounting and Miss Sashshay from the secretarial pool fondling my DOSPLUS 3.4. Now if I've told them once, I've told them a hundred times...use my coffee cup. Borrow my key to the employee lounge. Bend my paper clips but, leave my DOSPLUS alone!! Did they listen? Nooooo! Well, I guess I lost my head. Both Stamitz and Sashshay are doing fine. They should be released from the hospital any day now. For me, it's an entirely different story."

Signed,
0076697

Why DOSPLUS creates such fanatically touchy users is not so hard to understand. DOSPLUS 3.4 turns the TRS-80 into something altogether better.

DOSPLUS 3.4 lets your TRS-80 work a lot faster — 5-12 times faster with more accuracy, efficiency and dependability. DOSPLUS 3.4 also has a lot of features that users such as 0076697 find positively endearing. For instance, the ability to read 40 track disks in 80 track drives, and an easy to read operating guide that makes using DOSPLUS as easy as...well, bending a paper clip.

So to increase productivity, to increase the speed and accuracy of your TRS-80. DOSPLUS 3.4 Only $149.95! Still the best DOS for the cost!

P.S. "Get your own DOSPLUS"
0076697

DOSPLUS

DOSPLUS first in quality! First in the industry!

Call Toll Free 1-800-327-8724 ext. 207

MICRO SYSTEMS SOFTWARE, INC.
Specializing in the Tandy Line

5846 Funston Street, Hollywood, FL 33023
Outside of Florida phone toll free 1-800-327-8724 ext. 207
For Visa/MasterCard/C.O.D. Orders
Toll free lines will accept orders only!
For applications and technical information, call (305) 983-3390 or drop us a card. Dealers inquiries invited. 384

So Far, So Good...

Your Model III is a fine computer. So why settle for less than a fine disk storage system?

A fast, reliable disk storage system — no other device is so vital to the satisfactory performance of your computer. At Percom we build quality, high-performance disk drive systems. From gold-plated connector contacts to goldcad metal chassis structures. From proven design through 100% reliability testing. Percom disk systems are the standard by which others are judged — the industry's "gold standard," in a sense. And since Percom is the largest independent manufacturer of disk systems for microcomputers, you get Percom quality at very competitive prices. Add-on drives for TRS-80* computers start as low as $399. Complete first-drive systems for the Model III start at only $599. Put a quality Percom mini-disk storage system in your Model III. And save.

#1 For Your Model III

Percom TFD drives for your TRS-80* Model III computer are available in 40- and 80-track versions with single or dual heads. Single-head 40-track drives store 180 Kbytes; dual-head 40-track drives store 360 Kbytes. Eighty-track drives store slightly over twice these amounts. Of course these are formatted capacities. The Percom Model III controller handles up to four drives so it's possible to access almost three million bytes of on-line program and data files. You get Percom's OS-80/III Basic language DOS with each first-drive system, and your first drive may be either internal (add-in) or external (add-on). Percom TFD drives work with Model III TRSDOS and other Model III disk-operating systems. First-drive systems are pre-assembled. Installation is accomplished with simple tools.

#1 For Your Model I, Too

Percom TFD add-on drives for the TRS-80* Model I computer are available with the same features and the same quality control measures as TFD Model III drives. As for Model III drives, all Percom Model I drives are double-density rated. Install Percom's popular DOUBLER II in your Model I Expansion Interface and upgrade your Model I to provide the same storage capacity as the Model III.

Watch for Announcement of Percom's Low-Cost Hard Disk System for the Model III!

To order, or for the name of your authorized Percom retailer, call toll free **1-800-527-1222.**

PERCOM

PERCOM DATA COMPANY, INC.
11220 Pagemill Road • Dallas, Texas 75243
(214) 340-7081

The Drive People
You get more out of Percom disk systems.
Expect it!

PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

*TRS-80 is a trademark of Tandy Radio Shack Corporation which has no relationship to Percom Data Company, Inc.
PERCOM, DOUBLER II and OS-80/III are trademarks of Percom Data Company, Inc.

Yes... I'd like to know more about the best for my TRS-80 computer. Send me free literature about quality Percom products.

☐ MODEL I ☐ MODEL III

Send to
PERCOM DATA COMPANY INC Dept. 8-M
11220 Pagemill Road, Dallas, TX. 75243

NAME _____

STREET _____

CITY _____ STATE _____

ZIP _____ PHONE NUMBER _____

80 Contents

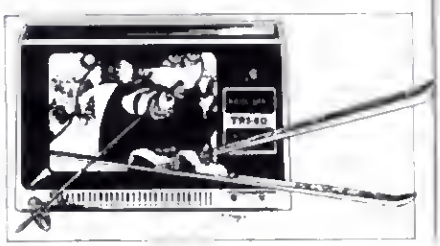
Features

66. Assignment 46
Tri-Lizards, flying hotel rooms, and other evils face Commander Harry A. Flynn in his latest adventure. Enjoy playing and then learn how to write your own adventure step-by-step.
Victor T. Albino

80. Outdoor Computer Games? Yep!
Summer is time for the great outdoors. But you find it hard to tear yourself away from your computer, right? With these two outdoor games for your 80, you don't have to.
Barry Adams

94. The Colorful Computer—Part 1
This begins a three-part series illustrating the great versatility of Tandy's CC. In this installment, 21 graphics programs help you learn how to draw with Radio Shack's powerful little machine.
Franklyn D. Miller

112. Ski Slalom
While you're lounging around the pool soaking up the rays, here's a cool reminder of what's waiting for you on the slopes come November.
Jake Commander



120. The Graphics King
At an early age, Leo Christopherson saw his future in his dreams. Also his inclinations in blowing up walnut shell ships and playing the accordion.
Steven Frann

124. TRON: Man in the Computer
Hollywood has taken us into outer space, under the ocean, to the center of the earth, and inside the human body. Now it's taking us inside a computer. What it finds there you won't discover by taking the case off your 80.
John P. Mello Jr.

132. The Game of Kalah
An ancient game of stones and strategy for you and your computer to play with. Also learn some rudimentary artificial intelligence techniques as applied to choosing and programming this game.
Jonathan D. Victor

Articles

106. Cube-80
Tired of thumb-blisters and misplaced colors? Let this program guide you to a finished cube once and for all.
Winefred Washington Jr.

114. Naval Wars
Swab the deck, hoist the mainsail, and all that rot, it's war on the high seas. For this duel at sea you need dual computers.
Arthur J. Byrnes

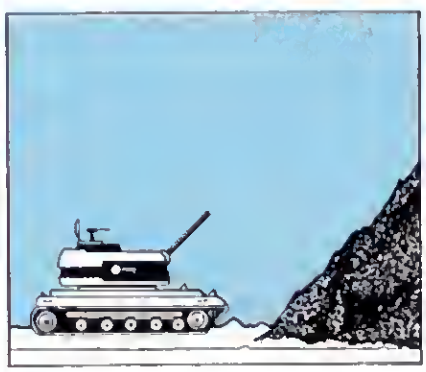
156. Tee for Six
For board game fans, here are six individual games. Get board with one, then go on to the next.
Carl Bevington

174. Save Our Ship
The galaxy is in danger and you, Captain Kirk, have been ordered back into action. The Federation has taken the Enterprise out of mothballs and you're off to battle the Klingons.
Randy Hawkins

186. The Master Muses
The author of one of the best reversi games for a micro explains why computers play the game so well.
Charlie Heath

188. Color Maze
A refreshing back-to-basics game for your CC. No aliens, underground monsters or bad guys, just a bunch of walls to bump into.
Richard A. White

202. Four in One Plus Another
Brickout, Poindexter, Mathtalk, Tank-Gun and PixPrint. CC games and a screen dump utility.
Larry D. Becker

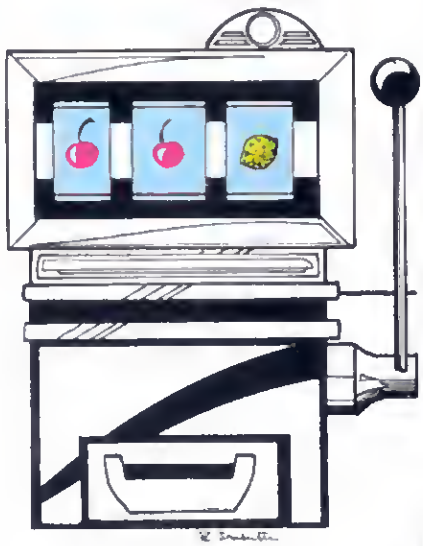


212. Sub Destroy, Model II Style
Take out your aggressions on enemy subs rather than on your fellow office workers.
Patricia Steele

216. Subs 'n Choppers
A classic air and sea battle with you in the cockpit of a helicopter.
Charles and Glenn Gillen

80 Contents

222. Casino Slot Machine
Keep your money in your bank account and turn your 80 into a less costly one-armed bandit. Programmable odds should keep the coins piled high in your favor.
Ron Balewski



234. Cram
Simple to play but hard to master, in short a real frustrator. Betcha can't play just one.
Hardin Brothers

240. Acrostic Generator
Making puzzles can be as fun as solving them using this program. Send letters or party invitations to your friends in puzzle form. The possibilities are aggravatingly limitless.
Jonathan Falk

248. Enter the Dragon
Roam the west, east, north, and south in search of an imprisoned princess in this Kung Fu-style adventure.
Brice Hadlock

254. Conquest of Memory Alpha
The evil Klaxons have implanted a mind control device in your brain and have sent you on a mission that could lead to the destruction of your own race. This adventure seems to have the odds stacked impossibly against you. Or are they?
L. L. Myers

260. Space Duel
Whether you own a Model I, III, or CC, this game is for you.
David Edick

264. Square Game
A CC adaptation of Merlin.
Chuck Kanach

268. Color Breakaway
All alone over the blue line... shot... Score! Hockey on your CC.
Mitchell Grossbach

270. Pitty Pat
Computers don't bluff. You're sure to find that out in this version of draw poker.
Lynard Barnes

274. Termites
An invisible maze game to improve your memory with a cherrywood snack at the end.
Charles Weindorf

280. Thru the Asteroids
No laser blasters or hyperspace to protect you in this overpopulated asteroid field. You have to guide your ship through the field to a landing base on the other side.
Joe D. Fugate

282. Alien Attack
Space Invaders plus Missile Command.
Larry F. Perry

286. Loco Motion
An intense "don't-bother-me-now-can't-you-see-I'm-busy" solitaire game. Fun for the whole family, one at a time.
Dennis Ridgway

296. Intellectual Somnambulism
A game for those who, tired of the hot-seat, want a little slow-paced action.
M. Keller

300. Stanley
A game that will have you asking the question: "But does it beat an afternoon nap?"
Dave Black

302. Amazing Cardoni II
The Amazing Cardoni returns to graphically amaze and entertain you.
Jon Mark O'Connor

378. Readers' Choice
Your chance to pick the best TRS-80 software on the market today.

Departments

8. Remarks
A call for more support for the Model II and a discussion of women and micros.
Wayne Green

12. Proof Notes
The editors look at the issues.

14. Input
Kudos for MONEY DOS, Loc-Editor and some alleged April fooling.

24. MONEY DOS
Talk about IRAs.
J. M. Keynes

28. 80 Accountant
Legal time accounting systems.
Michael Tannenbaum

34. Soft Bits
Sorting strings in memory.
Roger Fuller

80 Contents

PUBLISHER/EDITOR
Wayne Green
EXECUTIVE VICE PRESIDENT
Sherry Smythe
ASSISTANT TO PRESIDENT
Matt Smith
GENERAL MANAGER
Debra Wetherbee
ASSISTANT PUBLISHER
Jeff DeTray
FINANCIAL COORDINATOR
Roger Murphy
CIRCULATION COORDINATOR
603-924-9471
Patricia Ferrante
BULK & NEWSSTAND SALES MANAGER
Ginnie Boudreau
ADVERTISING: 603-924-7138
David Schissler, Advertising Manager, Hal Stephens, Susan Martin, Piergiorgio Saluti: Sales; Penny Brooks: Ad Coordinator
New England Advertising Representative: John A. Garland, Garland Associates, Inc., Box 314 SHS, Duxbury, MA 02332 617-934-6464
PRODUCTION
Nancy Salmon, Manager; Michael Murphy, Assistant. Frances Benton, Betty Butler, Theresa Ostebo, Scott Philbrick, Dianne Ritson, Deborah Stone, Irene Vail, Ad Coordinators. David Wozmak, Judy Wimberly, Advertising Production. Steve Baldwin, Fiona Davies, Bruce Hedin, Jane Preston
PHOTOGRAPHY
Sandra Dukette, Bryan Hastings, John R. Schweigert, Thomas Villeneuve, Robert M. Villeneuve
TYPESETTING
Melody Bedell, Sara Bedell, Debbie Davidson, Michele DesRochers, Jennifer Fay, Anne Rocchio, Ellen Schwartz, Lisa Steiner, Karen Stewart
DESIGN
Denzel Dyer, Howard Happ, Laurie MacMillan, Joyce Pillarella, Susan Stevens, Donna Wohlfarth

The left bracket, [, replaces the up arrow used by Radio Shack to indicate exponentiation on our printouts. When entering programs published in *80 Micro*, you should make this change.

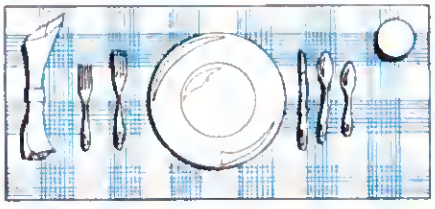
80 formats its program listings to run 64-characters wide, the way they look on your video screen. This accounts for the occasional wrap-around you will notice in our program listings. Don't let it throw you, particularly when entering assembly listings.

Article submissions from our readers are welcomed and encouraged. Inquiries should be addressed to: Submissions Editor, 80 Pine Street, Peterborough, NH 03458. Include an SASE for a copy of our writers' guidelines. Payment for accepted articles is made at a rate of approximately $50 per printed page; all rights are purchased. Authors of reviews should contact the Review Editor, 80 Pine Street, Peterborough, NH 03458.

36. Reviews
Armored Patrol, Forbidden City, Interactive Fiction and more.

60. Commander 80
On being a software author.
Jake Commander

62. Kitchen Table Software
Our friends from Sri Lanka get an adventure generator. Be prepared for New Jersey State Assembly Adventure and Haunted Delicatessen.
David Busch



308. News
An alleged scam on Compuserve and how to raise the hackles of the folks who make the SATs.

332. Feedback Loop
Japanese printers, ROM maps, sound routines, writing over TRS-DOS, fast graphic methods and more.
Terry Kepner

339. Notes from Beneath the Keyboard
What do chess, checkers and Reversi have in common? Competitive Tree Searches—Part I.
Paul Wiener

344. 80 Applications
The conclusion of the homebrew ROM pack for the Color Computer.
Dennis Kitsz

358. Copernica Mathematica
Rubik's Cube and other spatially-oriented puzzles.
Bruce Douglass

372. Education 80
Do microcomputer games have a legitimate place in the learning process?
Earl Savage

374. Medical Opinion
Automating your clinic.
Philip R. Mills, M.D.

385. Reload 80
Program compatibility
Art Huston

386. New Products
Guns of Fort Defiance, telephone monitor, tape reproduction system, data base lock and more.

What's the greatest TRS-80 software in the world? This is a barroom question that's likely to cause a riot at the local users club. To add fuel to the fire, *80 Micro* is launching its annual Readers' Choice Awards.

You'll find a list of commercial software on page 378. We've included the Models I, II and III and the Color Computer, and every kind of software from accounting to word processing. Just make your choices on the accompanying ballot and mail it in. We'll announce the winners in our January issue.

Also, you'll find details on our first annual Young Programmer's Contest on page 373. This contest will give budding beepers 18 years and under a chance to strut their stuff, and pocket some spare cash to boot. The winning entries will be published in our February 1983 educational issue.■

Circle 30 on Reader Service card.

galaxy of features

A GALAXY of features makes the **LNW80** a remarkable computer. As you explore the **LNW80**, you will find the most complete, powerful, ready to run, feature-packed personal and business computer ever made into one compact solid unit.

MODEL I COMPATIBILITY – The **LNW80** is fully hardware and software compatible with the Model I. Select from a universe of hardware accessories and software – from VisiCalc® to space games, your **LNW80** will launch you into a new world of computing.

FULLY LOADED – A full payload includes an on-board single and double density disk controller for 5 ¼" and 8" single or double sided disk drives, RS232C communications port, cassette and parallel printer interfaces are standard features and ready to go. All memory is fully installed – 48K RAM, 16K graphics RAM and 12K ROM complete with Microsoft **BASIC**.

QUALITY CONSTRUCTION – Instrumentation quality construction sets **LNW80** computers apart from all the rest. Integrated into the sleek solid steel case of the **LNW80** is a professional 74-key expanded keyboard that includes a twelve key numeric keypad.

HIGH RESOLUTION GRAPHICS & COLOR – The stunning 480 X 192 resolution gives you total display control – in color or black and white. The choice of display formats is yours: 80, 64, 40 and 32 columns by 24 or 16 lines in any combination of eight colors.

PERFORMANCE – Lift-off with a 4MHz Z80A CPU for twice the performance. The **LNW80** outperforms all computers in its class.

Our down to earth price won't send you into orbit

LNW Research Corp.

2620 WALNUT [illegible] CA [illegible]

(714) 641-[illegible] (TLX) [illegible]

Monitor and disk drives not included

TM Microsoft Software, Inc.

80 REMARKS

by Wayne Green

"The opportunities are there if women will see them. . . and act."

The Model II—Time for Support?

One of the discouraging aspects of the Model II is its lack of upward compatibility with software. It takes a major renovation of programs designed for the Model I or III before they can run on the II. This cuts off the prospective purchasers of the II from a wealth of software developed for the I. Worse, with the sales of the II running perhaps 10 percent of the I, the impetus for programmers to start all over and write programs for the II is reduced. Add to that the need for these programs to be far more comprehensive for this relatively expensive "business" system and you have the recipe for what has happened: very little support.

The lack of software support, in turn, has kept down sales of the II, further discouraging software firms from investing their money in developing the needed programs. Radio Shack appears to have been so wrapped up in the Model III that its software support of the II has been less than dynamic. And now, as if all that isn't bad enough, the Model 16 is coming out to replace the II. This, essentially, means that everyone has to start all over again.

Yes, I know that the 16 will run on II software. But once you have that 68000-based system, I suspect that there is going to be a great lack of interest in buying the system to run Z80-based (slower) software. That's kind of like buying a 12-cylinder car and turning off eight cylinders. No, programmers are back to square one.

The 16 came along at a poor time for the few programming firms that have chosen to support the II. I've been watching the software development for this system and I've seen some first-rate programs appear on the market recently. It takes a bit of selling to convince people that there really *are* some good programs for the II. The Radio Shack offerings have not been outstanding so far and that has discouraged the growth of interest in the II. Now, being in New Hampshire, it may be that I am insulated from the enthusiasm for Radio Shack software, but I have yet to get any letters from users claiming more than ho-hum feelings.

I gave a talk last year to a group of accountants who were using the II with an accounting package sold by an independent program house. They were certainly enthusiastic about the II when used with their program.

Quite recently a new accounting package from England has been getting top marks from everyone using it. And I've seen two medical office programs that hold great promise. Things *are* starting to move.

One of the more serious drawbacks of the II is its inability to accept a cassette input. If someone comes up with a relatively simple cassette interface for the II, this will be a needed product. While a cassette is slow for some uses, it's ideal for others. If programs can be transported on a cassette instead of a disk, the cost of the program can be reduced by about $10 to $15, just by the saving on the cost of the medium for loading the program. That can get to be a major difference when you're buying one or two new programs a month.

And since cassettes are simple to store and are almost impossible to harm (particularly when compared to a disk), they are a good medium for storing seldom needed archival records. They get through the mail a lot better than disks too, so they are a fine medium for sending programs or data somewhere. For these applications the speed of the cassette isn't relevant.

Old inventory records, names and addresses not immediately needed, and so on can be put onto cassettes and filed away. The cost is miniscule when compared to using 8-inch disks for this sort of archival storage. You don't use metal file cabinets for permanent records—you use those inexpensive cardboard file boxes.

So, readers, let's see some articles on cassette interfacing for the Model II. I'll make the space available in *80* for you if you do the work. And who knows, we may have another entrepreneurial business.

Another thing. Has anyone managed to interface some of the 5-inch disk drives to the II? This shouldn't be too difficult, so let's get some articles on it. We need to know how to go about it for both the hardware interface and the software patches needed to cope with the smaller disks.

And if that isn't enough, how about a protective power supply? It is worth a lot to any business to make the system so it won't lose the data being worked on if the power supply is lost. Let's see some articles on a small battery back-up system that will allow the computer to shut itself down without any loss of data when the power fails.■

Micros Vs Women

When computers first started being usad in businesses, the news for women was not all that good. Where they had previously had to sit typing invoices and statements all day, day in and day out, week after week, the computer changed this. Now they had to sit doing data input all day, day after day. Big change.

Of course, the increased efficiency of the computer made it so the typing of invoices and statements cost a lot less, at first paying for the computers and then bringing in extra profits for the firms, which permitted them to build even bigger and more gorgeous buildings. Eventually, as more firms brought in computers the bottom line was less expensive insurance or other products. It seems to take a long time for these benefits of computers to trickle down, if I am to judge by the proliferation of bank and insurance buildings.

None of this had much to do with smaller firms and their efficiency. Here, women still typed out the invoices and did steno work. Now, with smaller and less expensive computer systems, even the smallest of firms can take advantage of the time-saving benefits computers can provide. They reduce the work needed for accounting, billing, typing, record keeping, filing, and so on. They, in essence, are reducing what was chauvinistically called women's work in the office.

This is both a threat and an opportunity. With computers able to do routine work far cheaper than it can be done by hand, the day when women will be used for such drudgery is passing. This will either put women out of work or will free them for more challenging occupations. This will put women more into competition with men in white collar and managerial work.

Circle 13 on Reader Service card.

META TECHNOLOGIES

26111 Brush Avenue, Euclid Ohio 44132

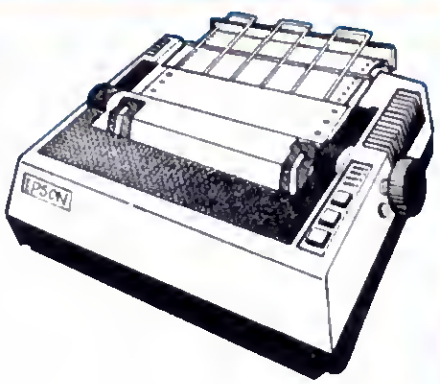
CALL TOLL FREE 1-800-321-3552 TO ORDER

IN OHIO, call (216) 289-7500 (COLLECT)

participating organization joint marketing services

EPSON

MX-80, MX-80FT, MX-100



NEW LOWER PRICES!

PRACTICAL PERIPHERALS MICROBUFFER™

8K Serial or 16K Parallel INTERFACE	$159.00
TRS-80 KEYBOARD INTERFACE & CABLE	$69.95
APPLE INTERFACE & CABLE	$99.95
IEEE-488 (PET) INTERFACE & CABLE	$79.95
SERIAL (RS-232) INTERFACE	$74.95
GRAFTRAX OPTION (MX-80 & MX-80/FT)	$59.95

EXTRA-LONG 10 ft. RIBBON CABLE **$24.95**

CONNECTS EPSON PRINTER & TRS-80 MICROCOMPUTER

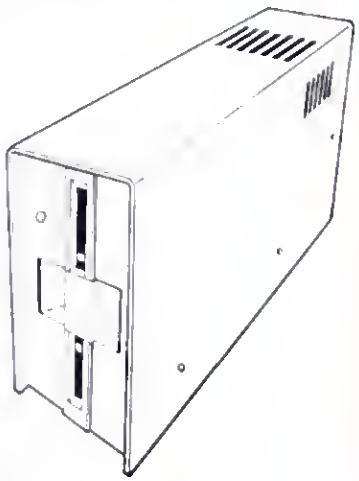
WE SERVICE WHAT WE SELL!

complete

DISK DRIVES

Includes Case, Power Supply and External Drive Connector

from **$289.95**



WE ALSO SELL THE INCOMPARABLE

TRAXX

ADD-ON DISK DRIVES

ONE-YEAR LIMITED WARRANTY

(Parts and Labor, write for complete details)

TRAXX Add-On Disk Drives are Individually Tested, Burned In, Ready to Plug In and Run, and Include Technical Documentation and a Static-Free Dust Cover.

CALL FOR PRICE

PARAGON Gold magnetics DISKETTES

MTC's

premium Single-Sided, Soft-Sectored DOUBLE-DENSITY, 5¼-inch diskettes with reinforcing HUB-RINGS. Individually 100% ERROR-FREE certified. Invest in GOLD!

PARAGON MAGNETICS GOLD $23.95

Scotch®

Soft-Sectored Diskettes

5-1/4" 1S/SDen (744-0)	$28.95
5-1/4" 1S/DDen (744D-0)	$31.95
5-1/4" 2S/DDen (745-0)	$39.95
8" 1S/SDen (740-0)	$29.95
8" 1S/DDen (741-0)	$37.95
8" 2S/DDen (743-0)	$49.95

Hard-Sectored Diskettes

5-1/4" 1S/DDen 10-sector (744-10)	$28.95
5-1/4" 1S/DDen 10-sector (744D-10)	$32.95
5-1/4" 2S/DDen 10-sector (745-10)	$39.95
5-1/4" 1S/SDen 16-sector (744-16)	$28.95
5-1/4" 1S/DDen 16-sector (744D-16)	$32.95
5-1/4" 2S/DDen 16-sector (745-16)	$39.95
8" 1S/SDen 32-sector (740-32)	$33.95
8" 1S/DDen 32-sector (741-32)	$39.95
8" 2S/DDen 32-sector (743-32)	$49.95

Supplies

5-1/4" Head cleaning kit	$29.95
8" Head cleaning kit	$29.95

Authorized Distributor Information Processing Products 3M

VERBATIM

Soft-Sectored Diskettes

5-1/4" 1S/DDen (MD525-01)	$26.95
5-1/4" 2S/DDen (MD550-01)	$39.95
5-1/4" 2S/4Den (MD557-01)	$51.50
8" 1S/DDen (FD34-8000)	$43.95

Hard-Sectored Diskettes

5-1/4" 1S/DDen 10-sector (MD525-10)	$26.95
5-1/4" 2S/DDen 10-sector (MD550-10)	$39.95
5-1/4" 2S/4Den 10-sector (MD557-10)	$51.50

'RINGS' & THINGS

HUB RING KIT for 5¼" disks	$10.95
HUB RING KIT for 8" disks	$12.95
REFILLS (50 Hub Rings)	$ 5.95
CLEANING KIT for 5¼" drives	$24.95
5¼-inch diskette case	$3.50
8-inch diskette case	$3.95
5¼-inch File Box for 50 diskettes	$24.95
8-inch File Box for 50 diskettes	$29.95

TRS-80 is a trademark of the Radio Shack Division of Tandy Corporation. DATALIFE is a trademark of VERBATIM. PLAIN JANE, PARAGON MAGNETICS are trademarks of MTC.

© 1982 by Meta Technologies Corporation

MOST ORDERS SHIPPED WITHIN ONE BUSINESS DAY

24 Hr. Bulletin Board (216)289-8689

PRICES IN EFFECT THRU August 31, 1982

Prices, Specifications, and Offerings subject to change without notice

8208

WE ACCEPT
- VISA
- MASTER CHARGE
- CHECKS
- MONEY ORDERS
- C.O.D.

- Add $3.00 for shipping & handling.
- $2.00 EXTRA for U.S. Mail delivery.
- $3.00 EXTRA for C.O.D.
- Ohio residents add 6.5% sales tax.

This is higher paying work, so the competition is going to be tougher. There are great vacuums as far as the supply of some types of white collar work is concerned. Most firms are hurting for good managerial talent. On one side is an ever-increasing need for good managers. On the other is a pool of people, few of whom seem to want to improve themselves and take on more responsibilities. It's as if many of the women who are doing the work being replaced by computers are blind to what is happening and totally disinterested in developing their abilities so they'll have something to do when they are replaced.

Both women and men have to face one thing: everything is changing. The emergence of small computers is going to change the way we do virtually all business. For blue-collar workers it means the computerized control of robots to do the routine work. It means computerized testing and inventory.

In the office it means a continued step-up in efficiency in filing, letter writing and accounting as just about every function of the office is automated and made more cost effective. We've gotten way behind on cutting management and office costs, so we'll see the biggest changes here.

As the costs of production and overhead are reduced, this is going to make more money available for sales, marketing, promotions, advertising, and so on. This is going to call for people with experience in these fields. How many people are learning about purchasing today? Few, yet this experience is desperately needed by medium to large firms. There is such a dearth of good writers that it will take years for us to catch up. This lack alone is costing industry hundreds of millions of dollars in sales. Virtually every business needs some people who can write to help produce instructions, sales literature, material for salesmen and reps, and so on. The opportunities are there if women will see them. . . and act. Otherwise it could be a disaster.

It is a shame that our educational institutions are doing so little to help people cope with this extraordinary change. Where are the courses in speed reading, in public speaking, in writing reports, writing advertising? Where are the courses in management of personnel? Where can one go to school to learn about typesetting, graphic arts, printing, saleemanship, marketing, and all of the other skills needed to run small businesses? The fact is that there is little available. Yet this is where the need is and it is getting stronger.

One of the keys to success is to perceive a need and then fill it. If we look critically at what small, inexpensive computers are going to be able to do for us, we are going to see a wealth of ways we can benefit from going with the flow. No amount of fighting computers is going to help—they are able to do too much.

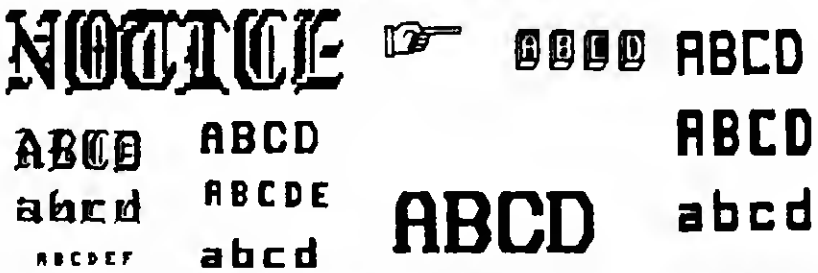
In the office, women, in general, have a distinct advantage over most men. Most women have already learned to type, so they are naturals for getting involved with computers. Men who have never bothered to learn to type tend to be put off by computers, where the entry mode is typing. Since in communications there is power, women can use this psychological advantage to great effect. But this does mean the need for women to be ready to try new things and learn.■

GEAP DOT WRITER

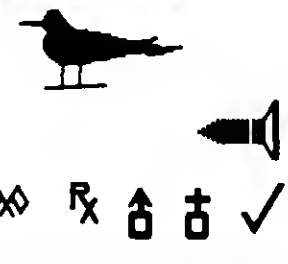
Another **GEAP** expansion module for Epson Grafttrax Owners

FEATURES: GEAP CHARACTER FONTS•Create High Res Drawings without TRS-80 modifications or programming knowledge•Create or modify fonts•Print time options such as magnify, dot, spacing control, reverse and more•Library function allows saving to disk, printing or re-editing.

ACTUAL CHARACTER FONTS / SIZE



SAMPLES - High Res and Modified Characters



GEAP is modular in form. We have a package for just about every system. If you don't see components for your system, call us; we probably didn't have room to list it.

16 - 48K SYSTEMS — CASSETTE - DISK - OR STRINGY

GEAP 1.3 $25.99 - The famous **GEAP** editor; draw, rotate, magnify, "paintbrush" merge, write basic program — just a few of the options.

Here is what the reviewers have said about **GEAP 1.3:**

"I have seen other programs that claim to do what GEAP does, but no other has lived up to my expectations"—Richard McGarvey, 80 Microcomputing, March 1982, p. 57.

"Of all the TRS-80 programs that have passed my way, none has exceeded my expectations as this one has, GRAPHICS EDITOR AND PROGRAMMER by Bill Meson"—Margaret M. Grothmen (Softside Magazine, Jan. 1982)

EXPANSION MODULES 1-5 $16.99. More magnify, rotation and other commands, "INSTANT BLOCK" letters to speed up your drawing. Magnification allows manipulation of the Instant Letters, giving you many variations.

48K SYSTEMS

GEAP 2.1 $45.95. A special enlarged **GEAP** 1.3 Editor plus over 10 **GEAP** Expansion Modules. Instant Letters, EPSON/DKIDATA Block "block graphics" support. Quickcursor module with 2 speed controllable cursors, rectangle, line and circle commands. 2.1 also includes the NEWSCRIPT interactive module. (For other printer support - call)

GEAP DOT WRITER - You get all of the 2.1 Package plus all of the Dot Writer's high resolution capabilities. With this package you enter a new world. (Epson Printer Support only at this time). **$75.95**

✓ 273

MOD I/III **J F CONSULTING / 74355 BUTTONWOOD / PALM DESERT, CA 92260 / (714) 340-5471** MC/VISA

Scanned by Ira Goldklang - www.trs-80.com

META TECHNOLOGIES

participating organization — joint marketing services

26111 Brush Avenue, Euclid Ohio 44132

CALL TOLL FREE 1-800-321-3552 TO ORDER

IN OHIO, call (216) 289-7500 (COLLECT)

MTC AIDS-III™

MODELS I & III ...$69.95 MODEL II . . .$99.95

Introducing the latest addition to MTC's family of data management systems, AIDS-III. NO PROGRAMMING, easy to use. COMPLETE PACKAGE including demonstration application, documentation and MAPS-III (see below).

- Up to 20 USER-DEFINED FIELDS of either numeric- or character-type
- CHARACTER-type fields may be any length (total: up to 254 characters).
- NUMERIC-type fields feature automatic formatting, rounding, decimal alignment and validation
- Full feature EDITING when adding or changing records:
  - ENTER FIELD (can't type-in more characters than specified).
  - BACKSPACE (delete last character typed)
  - DELETE FIELD contents
  - RESTORE FIELD contents.
  - RIGHT-JUSTIFY FIELD contents
  - SKIP FIELD (to next or previous field)
  - SKIP RECORD (to next or previous record).
- SORTING of records is MACHINE CODE assisted.
  - 200 RECORDS (40 characters) in about 5 SECONDS.
  - ANY COMBINATION of fields (including numerics) with each field in ascending or descending order.
- SELECTION of records for Loading, Updating, Deleting, Printing and Saving is MACHINE CODE assisted.
  - Specify up to 4 CRITERIA each using one of 6 RELATIONAL COMPARISONS.
  - LOAD or SAVE selected records using MULTIPLE FILES.
  - Example. Select records representing those people who live in the state of Colorado, but not in the city of Denver, whose last names begin with "F" and whose incomes exceed $9000.00
  - Example: Select records representing those sales made to XYZ COMPANY that exceed $25.00 between the dates 03/15 and 04/10

MAPS-III (MTC AIDS PRINT SUBSYSTEM), included at no charge, has the following features:

- Full AIDS-III SELECTION capabilities.
- Prints user-specified fields DOWN THE PAGE.
- Prints user-specified fields in titled, columnar REPORT FORMAT, automatically generating column headings, paging and (optionally) indentation.
- Can create a single report from MULTIPLE FILES.
- Prints user-defined formats for CUSTOM LABELS, custom forms, etc

BELOW ARE TESTIMONIALS from owners of AIDS systems. These are absolutely authentic statements and are typical of the comments we receive

"This program will do more for my business than all the other programs I have, combined."
David Wareham, Vice President (EDP), National Hospital and Health Care Services Inc.

"We have 32 different Data Base Management packages for the TRS-80. AIDS-III is easily the best. It also makes it easier for us to step up to our Model II since the package is available for both computers."
Jack Bilinski, President, 80 Microcomputer Services

"Your AIDS program is far and away the finest information management system that I've ever seen. I am currently using it to maintain a clear picture of the demographic data on all the kids in our residential treatment program and it is working for me superbly."
Frank Boehm, Director, Front Door Residential Treatment Program

AIDS OWNERS! WE HAVE WHAT YOU'VE BEEN WAITING IV. . .

MTC CALCS-IV™, that is.

- More Computations
- Save Report Formats on Disk
- Faster, and more!

MTC CALCS-IV™.....$39.95
For Models I & III $39.95
For Model II $59.95

MTC AIDS MERGE-III™

This subsystem will combine up to 14 AIDS-created data files into a single, large file. An optional purge capability removes duplicate entries while performing the merge operation (can even be used to eliminate duplicates in a single file). Machine-code assisted for high-speed performance, MERGE-III™ properly handles files sorted by any combination of fields, including numerics, with each field in ascending or descending order.

MTC AIDS MERGE-III™.....$19.95
For Models I & III $19.95
For Model II $29.95

THE COMPLETE MTC AIDS-III™ PACKAGE

SAVE $$$$

Includes MTC AIDS-III™ CALCS-III™ and MERGE-III™

A comprehensive system at a competitive price!

MODEL I & III $99.95
MODEL II $149.95

Add $2S for CALCS-IV™

MTC CALCS - III™

Models I & III $24.95
Model II $39.95

MTC's most popular AIDS subsystem. Use for report generation involving basic manipulation of numeric data. Features are:

- Columnar Headings
- Optional Indentation
- User-specified Columnar Totals
- Columnar values computed using constants and/or column values
- Balance forward calculations
- Use for accounting, inventory, financial and other numeric-based systems. etc

EPSON PRINTERS

DISK DRIVES

DISKETTES

BOOKS and more!!

AIDS/P™ IS HERE!

TRS-80 is a trademark of the Radio Shack Division of Tandy Corporation. DATALIFE is a trademark of VERBATIM. PLAIN JANE, AIDS-I, AIDS-III, CALCS-III, CALCS-IV, MERGE-III are trademarks of MTC.
©1982 by Meta Technologies Corporation

MOST ORDERS SHIPPED WITHIN ONE BUSINESS DAY

24 Hr. Bulletin Board (216) 289-8689

PRICES IN EFFECT THRU August 31, 1982
Prices, Specifications, and Offerings subject to change without notice
8208

WE ACCEPT
- VISA
- MASTER CHARGE
- CHECKS
- MONEY ORDERS
- C.O.D.

- Add $3.00 for shipping & handling.
- $2.00 EXTRA for U.S. Mail delivery.
- $3.00 EXTRA for C.O.D.
- Ohio residents add 6.5% sales tax.

Proof Notes
the editors look at the issues

MANAGING EDITOR
Eric Maloney
SENIOR COPY EDITOR
Michael Nadeau
NEWS EDITOR
John P. Mello Jr.
REVIEW EDITOR
Janet Fiderio
NEW PRODUCTS EDITOR
Steven Frann
EDITORS
Lynn Rognsvoog, Carolyn Nolan, Kerry Leichtman, Caron Taylor
TECHNICAL CONSULTANT
Jake Commander
TECHNICAL EDITORS
Dennis Kitsz (Contributing Editor)
G. Michael Vose (Features, Editor)
Art Huston (Editor)
PRODUCTION EDITOR
Susan Gross
LAYOUT EDITORS
Joan Ahern, Bob Dukette, Sue Hays, Anne Vadeboncoeur
PROOFREADERS
Peter Bjornsen, Patrice Laughner, Louis Marini
EDITORIAL ADMINISTRATION
Pat Graham, Nancy Noyd

Subscriptions:
Problems with Subscriptions: Send a description of the problem and your current and/or most recent address to: *80 Micro*, Subscription Department, PO Box 981, Farmingdale, NY 11737.
Change of Address: Send old label or copy of old address and new address to *80 Micro*, PO Box 981, Farmingdale, NY 11737. Please give eight weeks advance notice.
Microfilm: This publication is available in microform from University Microfilms International. United States address: 300 North Zeeb Road, Dept. P.R., Ann Arbor, MI 48106. Foreign address: 18 Bedford Row, Dept. P.R., London, WC1R4EJ, England.
Dealers: Contact Ginny Boudrieau, Bulk Sales Manager, *80 Micro*, Pine St., Peterborough, NH 03458. (800)258-5473.

We've never worked so hard. Sweat, toil, fatigue—stack them all up and it doesn't come close to the flat-out effort we dedicated to producing this issue.

You went to know how hard it was? I had to play every game submitted.

I can hear you chuckling. "Play? That's hard work?" Go ahead and scoff, but imagine what it was like to come to work day after day only to be shot out of the sky by fleets of submarines, zapped by hordes of aliens, and beaten at card and strategy games by a sleek gray machine. There were times when I considered leaving for less hazardous work—maybe as a soldier of fortune or Marvin Hagler's sparring partner.

This games issue has games for every TRS-80 computer—yes, even the Model II. Sub Destroy, by Patricia Steele, transforms your business machine into a watery battlefield. The Color Computer is also well represented. Larry Becker sent us one article with four individual games. Check out the graphics in Tank-Gun.

Speaking of graphics, Part I of Franklyn Miller's three-part series on the Color Computer includes 21 programs that explore some of the CC's special graphics functions. Apply them to your own game programs.

Hardin Brothers wrote Cram as a programming experiment. The program is short and simple, and the game is downright addicting. Addicting and frustrating would be a good way to describe Dennis Ridgway's Loco Motion. Although nothing like Rubik's Cube in appearance, the same logic is needed to solve the puzzle. You have to arrange numbers into preset patterns. That would be easy, except the numbers are constantly revolving around oval tracks. Termites is another frustrator. Charles Weindorf wrote it as an exercise to improve his memory, but wound up with a new bad habit—biting his nails.

And while we're on the subject on nail-biting, in The Conquest of Memory Alpha, L.L. Meyers has us playing the role of Buck Starton at the mercy of the evil Klaxons who have planted a mind controller in his brain. In this adventure you, at the bidding of the evil Klaxon ruler, are to steal the plans for a super dreadnaught.

Victor Albino also supplies adventurists with some fun in Assignment 46. Harry Flynn is the hero's name in this one, and his mission is to protect the Ring City and the Pile Stargate. Enjoy these adventures and then write your own. Albino also offers, in the same article, a step-by-step approach for writing an adventure, using Assignment 46 as an example.

Enter the Dragons, by Randy Hawkings, is a Kung-Fu type adventure. Your mission, little grasshopper, should you decide to accept it, is to save princess Syndi from imprisonment in a dungeon. But the hills are chock full of outlaws and mystics, so be careful.

One of my favorite games in this collection is Charles and Glenn Gillen's Subs n' Choppers. You're flying the chopper and dropping depth charges on the subs. The graphics are good, but even better is the sound: the thwunk, thwunk, thwunk of the helicopter's rotors sounds just like a helicopter going thwunk, thwunk, thwunk.

The Game of Kalah is an ancient game gone micro. And well done, too. Jonathan Victor's aim was to achieve a form of artificial intelligence. If AI can be defined as good enough to make you swear at the machine, then I guess he did it. The article discusses the philosophies involved in choosing the right game in to program intelligence.

In the same vein, Charlie Heath, author of Master Reversi (the best reversi game out), took time to muse on the game for us. Paul Wiener reappears this month in his Notes From Beneath the Keyboard column and discusses the programming tree logic used in computer reversi. Paul attended the North American Computer Othello Championship, held in May, where Heath's reversi won the world championship, and has some things to say about that.

I went to stop writing about the games, but I keep remembering ones you shouldn't miss. For instance, Jonathan Falk is a puzzle nut. To keep his puzzle supply high he wrote a program that generates acrostic puzzles.

I tried to persuade Jake Commander to write Ster Trek 4.5 for the issue, but he opted for Ski Slalom, or Death Plunge, depending on your point of view. But figuring a games issue wouldn't be complete without a game for trekkies, we've included Save Our Ship by Randy Hawkins.

—Kerry Leichtman

Circle 13 on Reader Service card.

META TECHNOLOGIES

26111 Brush Avenue, Euclid Ohio 44132
CALL TOLL FREE 1-800-321-3552 TO ORDER
IN OHIO, call (216) 289-7500 (COLLECT)

participating organization
joint marketing services

1001 THINGS TO DO WITH YOUR PERSONAL COMPUTER

BY MARK SAWUSCH

333 pages $10.95

333 pages, written in simple terms, of "what-to-do" and "how-to-do-it". Suitable not only for microcomputers, but for programmable calculators as well. Includes program listings, formulas, a glossary of computer terms and more! Definitely a MUST BUY!

"TRS-80™ DISK AND OTHER MYSTERIES"

by Harvard C. Pennington

132 pages written in PLAIN ENGLISH packed with HOW TO information with details, examples and in-depth explanations. Recover lost files and directories, remove file protection, make BASIC programs unlistable. How to use SUPERZAP, recover from DOS errors and MORE!

TRS-80™ DISK $19.95

"OTHER MYSTERIES" VOLUME II

by James Farvour

"MICROSOFT™ BASIC DECODED & OTHER MYSTERIES for the TRS-80™" is a primer for the internal workings of cassette and disk BASIC. More then 300 pages of explanations, examples and comments about the Level II ROM.

MICROSOFT™ BASIC DECODED $26.95

"OTHER MYSTERIES" VOLUME III

by Dennis Kitsz

More than 300 pages of practical hardware and software modifications and projects. Discover the mysteries of "THE CUSTOM TRS-80™"!

THE CUSTOM TRS-80™ $28.95

"OTHER MYSTERIES" VOLUME IV

BASIC FASTER AND BETTER

Time-tested and proven techniques and routines that can be used in hundreds of ways to make your programs smaller, faster and better.

BASIC FASTER & BETTER $28.95
BFBLIB subroutines diskette $19.95
BFBDEM demonstration diskette $19.95

WE'RE NOT JOKING WHEN WE TELL YOU THESE ARE GREAT "ONE-LINERS"...

Let's get down to the bottom line. Sure, we could tell you that we have scores of thousands of satisfied customers. Or that we're in our fifth year of serving the microcomputer industry. We could invite you to call your local Better Business Bureau and check us out (we're a member organization). But we think that one look at these prices will convince you there is more to MTC than great service... we also have a great sense of humor.

MODEMS

NOVATION CAT (acoustic coupled) . . . . . $ 139.95
NOVATION D-CAT (direct connect) . . . . . $ 159.95
NOVATION AUTO-CAT (auto answer) . . . . . $ 209.95

PRINTERS

OKIDATA ML80 (80 col., 80 cps) . . . . . $ 349.95
OKIDATA ML82A (80 col., 120 cps) . . . . . $ 469.95
OKIDATA ML83A (132 col., 120 cps, tract.) . . . . . $ 719.95
OKIDATA ML84 (132 col., 200 cps, 1200 bd) . . . . . $ 999.95
OKIDATA ML84S (132 col., 200 cps, 9600 bd) $1119.95

MODEL I/III SOFTWARE

APPARAT'S NEWDOS/80-V2 + FLOPPY DOC + QUE CARD . . . . . $ 129.95
M.S.S. DOSPLUS 3.4 + FLOPPY DOCTOR . . . . . $ 119.95
EAGLE SOFTWARE'S MONEY DECISIONS™ + 10 diskettes . . . . $ 199.95

MODEL II CP/M SOFTWARE

MICRO PRO's WORDSTAR™ . . . . . $ 299.95
MICRO PRO's MAILMERGE™ (needs WORDSTAR) . . . . . $ 99.95
MICRO PRO's SPELLSTAR™ (needs WORDSTAR) . . . . . $ 189.95
MICRO PRO's DATASTAR™ . . . . . $ 229.95
MICRO PRO's SUPERSORT™ . . . . . $ 189.95
MICRO PRO's CALCSTAR™ . . . . . $ 229.95

ACCESSORIES

EPSON SERIAL INTERFACE, 2K buffer . . . . . $ 99.95
EPSON SERIAL INTERFACE, 2K buffer, XON/XOFF . . . . . $ 109.95

WHILE QUANTITIES LAST!

CP/M is a registered trademark of Digital Research

Michael Shrayer's

ELECTRIC PENCIL VERSION II

for
Model I and Model III

An expanded version of the critically acclaimed original word processing system! Includes all features of Version I plus many new extensions. Runs under most disk operating systems, has improved video text handling, loads any ASCII file for editing (including BASIC files), single sheet mode for printing on letterhead and more! Simple to use, features 2-key commands. An incredible package at an incredible price!

SPECIFY MODEL I OR III

Disk Version $79.95
Tape Version $69.95

Let your TRS-80™ Test Itself With

THE FLOPPY DOCTOR & MEMORY DIAGNOSTIC

by David Stambaugh

A complete checkup for your MODEL I or MODEL III. THE FLOPPY DOCTOR-Version 3 completely checks every sector of single or double density 35-, 40-, 77-, or 80-track disk drives. Tests motor speed, head positioning, controller functions, status bits and provides complete error logging. THE MEMORY DIAGNOSTIC checks for proper write/read, retresh, executability and exclusivity of all address locations. Includes both diagnostics and complete instruction manual.

SYSTEM DIAGNOSTICS . $24.95
For MODEL III $29.95

← MORE PRODUCTS

TRS-80 is a trademark of the Radio Shack Division of Tandy Corporation. DATALIFE is a trademark of VERBATIM. PLAIN JANE, AIDS-I, AIDS-III, CALCS-III, CALCS IV, MERGE-III are trademarks of MTC.
©1982 by Meta Technologies Corporation

MOST ORDERS SHIPPED WITHIN ONE BUSINESS DAY

24 Hr. Bulletin Board (216)289-8689

PRICES IN EFFECT THRU August 31, 1982
Prices, Specifications, and Offerings subject to change without notice

WE ACCEPT
- VISA
- MASTER CHARGE
- CHECKS
- MONEY ORDERS
- C.O.D.

- Add $3.00 for shipping & handling.
- $2.00 EXTRA for U.S. Mail delivery.
- $3.00 EXTRA for C.O.D.
- Ohio residents add 6.5% sales tax.

80 INPUT

"The main reason for failure in data processing is system design, not programming."

Meaningful Descriptions

Time is of the essence, particularly when skimming through *80 Micro*. For those of us who want to save time how about replacing the cute subtitles in the table of contents with a meaningful description of the article? This would allow a reader to more easily identify the article that is of interest.

Irwin Kaufman
Canoga Park, CA

We're one step ahead of you—check out this month's table of contents. You'll also note that the titles of Color Computer articles are printed in color, for the convenience of our CC owners.—Eds.

Excellent Investment Aid

As a small investor in the stock market, I was most pleased to see the MONEY DOS column by J. M. Keynes. The programs have helped me look at other types of investments that I had previously ignored. I liked the last column on options and am now starting to investigate this area as a result of the MONEY DOS column.

The MONEY DOS line, referenced in the April 1982 issue, is an excellent investment aid in the options area. I would like to thank Mr. Keynes for making that service available free of charge to small time investors such as myself.

This well done column is a big plus for your magazine and represents the type of articles that have direct applicability to the hobbyist and are most welcome at any time.

Please keep this column coming!

Michael D. Olson
San Jose, CA

Terrific Program

No one who programs in Basic should fail to type in the little program on page 206 of the April 1982 issue of *80 Micro*. Mr. O'Connor did a fantastic job that works. I'm surprised that Load 80 did not incorporate this little gem into its cassette.

Loc-Editor is great. I input it last night and ran it with a program I was having trouble debugging, and to my delight it found the little imp of a misspelled word.

Take the time to type it in. Loc-Editor is terrific!

Alfred L. Tripamer
Olympia Fields, IL

Easy Disks

James S. Shaefer's article "Do-It-Yourself Disks" (*80 Micro*, January 1982) intrigued me from first reading. I purchased a Model III last year and have been saving ever since to convert to disk drive operation.

Mr. Shaefer's excellent article and the photographs gave me the confidence to contact VR Data Corp. to discuss the purchase of disk drives. I requested MPI disk drives in the Disk III package based on the information in the 1982 Buyer's Guide section of the same issue of *80 Micro*. Using the instructions from the Disk III package and the article from your magazine, I installed the disk drives into my computer. My installation was successful. Indeed, as Mr. Shaefer claimed, this process was not overly complicated and was completed in a relatively short time.

Thanks to your magazine and Mr. Shaefer's article, my TRS-80 is now more versatile.

Daniel L. Cheraz
Twenty-Nine Palms, CA

Ridding the Galaxy of Klingons

I wanted to tell you how successful your Star Trek 4.0 game (*80 Micro*, August 1981) has been with our family. I entered it on my PMC-81 and saved it on disk shortly before Christmas. One son, home from college, has become an expert. His latest (and highest) score to date is 1105.26. Now that he is returning to school, the rest of us can get efficiency scores of 600-800 and not feel too inadequate!

Have you thought of a contest? Would you like to use the above score as a starting point for such a contest? Would you consider a one-year subscription to *80 Micro* as a fair prize for the above score?

Thanks again for the game.

Philip J. Hess
Missoula, MT

Editor's Log—Stardate 8/82

It would be more logical to promote friendly competition between Federation fleets. Ridding the galaxy of Klingons seems reward enough. But beam your results to Commander Jake at our starbase in Peterborough. Maybe, in a few light years, we will organize a competition among the fleet commanders who have best proven themselves in battle.—Starfleet Command.

Do It Better

In the April 1982 issue of *80 Micro* is an article I co-authored titled "Model I Do Files." One user contacted us and was confused about how to specify files and protect memory in Basic when using the Start program. To save other users effort in accompliishing this I would like to give more detailed directions. In the example given in the article, starting at location 6B31 are three OD codes (which are equivalent to three <Enter> commands from the keyboard). The second <Enter> gives the default value of three files. If a user wishes, for example, one file, he should insert before the second OD code the hexadecimal code for the ASCII character 1 (which is 31). If a user wishes to protect memory above 31000, for example, insert the hexadecimal codes for the ASCII characters 31000 (which are 33 31 30 30 30) before the third OD code. It's easy to remember this if you note that in the hex codes for ASCII numerals a 3 always precedes the value of the numeral.

I have found another use for the Start program which should be of interest to

many users. When using a dot matrix printer (such as the Radio Shack Line Printer IV), most machine language programs will use only the 10 cpi printing mode. When using VisiCalc this limits the number of columns to eight. By turning on the printer and running a short Basic program you can set the printer to a compressed (16.7 cpi) print mode, giving up to 14 columns on a page (enough to show 12 months and some titles, for example). A variation on the Start program can simplify this task. The following Basic program gives the compressed type mode with the Line Printer IV (other printers may use other CHR$ codes):

```
10 LPRINT CHR$(27); CHR$(20)
20 DEFUSR1 = &H402D
30 A = USR1(X)
```

Lines 20 and 30 in the above program exit Basic and return to DOS Ready. This is a valuable trick anytime you need a Basic program to do some small task and immediately return to DOS Ready. (The entry point of 402D hex is for TRSDOS 2.3 and may be different with other operating systems.)

I saved this program under the name S. I then modified the Start program beginning at location 6B37 to the hexadecimal codes for the ASCII characters S and the required ender (22 53 22 0A) and used the TapeDisk utility to save this program under the name Small (line 10 in Fig. 1 of the article is changed to: F SMALL/CMD:0 6B00 6B3A 6B00). When I want small type for a VisiCalc report I boot the disk, turn on the printer, type SMALL <Enter>, and then VC<Enter>. You can also use Small with Scripsit and other machine language programs. By changing the CHR$ codes in the Basic program you can use other available type styles depending on what is available on the printer you use.

Philip F. Jackisch
Royal Oak, MI

Just Stringing Along

I was delighted by all the utility programs published in the April issue of *80 Micro* and immediately ordered Load 80.

There is an easier way to load machine language programs into a string than that given in the article "Memory Size?". Program Listing 1 shows how to do it with data statements and Program Listing 2 shows an even easier way to do it (I assume you have assembled 30-byte programs at FF00H). After running the Basic program, List will do peculiar things when it prints line 1 which holds the machine language program. The USR routine can now call the beginning of the Basic program plus 12 bytes (line 0 equals seven bytes, line 1 equals five bytes—two for next address, two for line number and one for the REM token). This solves the problem of string garbage collecting moving the program.

Burt L. Fenner
Lemont, PA

Shattered Mirror

I recently purchased a new Epson MX-80 printer with the Graftrax option for my Model III after reading the article "Mirror Imagining" in the March issue. I installed the Graftrax ROM according to the instructions and tried to run the programs as listed in the article but the printer didn't work. At first I thought I installed the ROM incorrectly but after recalling the differences between the Models I and III, I soon realized the problem. In Program Listings 3, 4 and 5, the characters are POKEd to the printer by lines 100, 1010 and 1010, respectively. For the Model III you need to route these characters to port 248. Change these lines to read OUT 248,A.

Bruce D. Gover
Orange, CA

In addition you should change the printer tests. In Listing 3 change line 90 to read IF PEEK(14312) AND 240<>48 THEN90. *In Listings 4 and 5 change line 1000 to read* IF PEEK(14312) AND 240<>48 THEN 1000.—*Eds.*

More Subroutines

In an effort to push *80 Micro* toward a public service for the newer members of the flock, I propose this fine magazine devote one full page each month to often-used routines. This would include Basic merges, Break locks, and so on.

Jon Mark O'Connor
Waterville, ME

We printed a collection of valuable subroutines in the article "Zubroutines" by Peter Ashley in the April 1982 issue.—Eds.

Utilities Update

We are grateful to your magazine for including our two utility programs in your Buyer's Guide to Utilities (*80 Micro*, April 1962), but we wish to clear up some discrepancies in the information you provided.

Program Innovations currently offers two utility packages, Macro Assembler and Disassembler. We have apparently misnamed Macro Assembler as it is not an assembler at all. It is an extensive macro library intended to complement Radio Shack's Editor/Assembler (Model II). The Guide states the Macro Assembler will run in a minimum RAM configuration of 64K. Both utilities will run in 32K or 64K machines as well as any Model 16 configuration available. We provide both packages on the latest operating system (DOS) available from Radio Shack (currently TRSDOS 2.0a).

Our Disassembler for the Model II/16 has output to screen, printer or disk. You can use the disk file in conjunction with

```
10 DATA 14,66,66,192,53,61,64,230,253,196,62,211,255,214,62,211,255,197
20 DATA 16,254,193,16,242,13,121,246,66,32,234,201
25 CLEAR 60
30 FOR N=1TO30
40 READ X
50 A$=A$+CHR$(X)
60 NEXT
```

Program Listing 1

```
0 GOTO 5
1 REM 123456789012345678901234567890*
5 REM *** LOAD A MACHINE PROGRAM OF 30 BYTES FROM LOCATION 7F06
TO BEGINNING OF BASIC +12 WHERE IT CAN BE EXECUTED
10 FOR X=0TO29
20 POKE PEEK(16548)+PEEK(16549)*256+12+X,PEEK(32512+X)
30 NEXT
40 DELETE 10-40
50 POKE 16526,PEEK(16540)+12
60 POKE 16527,PEEK(16549)
70 Z=USR(0)
```

Program Listing 2

Doris believed herself the most "fully formed" character in the office.

Until she became an Orange Micro Printer Expert.

Printers Can Be Confusing. Sometimes, even the informed personal computer owner is caught short by the mound of technical differences in printers. Had Doris come to Orange Micro sooner, she'd know a *fully-formed character* was similar to the crisp, solid typestyle that came from her office typewriter.

We Educate First. With so many different printers out there with as many different features, we feel a printer education is in order. We take what you already know about computers and explain printers in the same terms. Our current customers seem to like that because of the friends they refer. (Nearly 50% of our business is referral.)

It's Easy To Be An Expert. Orange Micro printer specialists are there to make you feel comfortable with your newfound printer knowledge. And when you decide on the printer right for you, you'll know exactly why you picked it from all the rest. With over 35 popular models to choose from, and a complete selection of cables, options and interface accessories, we have everything you need to get your new printer up and operating in minutes.

We Have The Right Printer For You. Bring along your toughest printer questions. Our salespeople will answer them honestly and practically. In less time than you'd imagine possible, you'll be a printer expert too! After all, printers are our only business, so we always do a better job at finding the right one for you.

Orange Micro Printer Stores
3150 E. La Palma Suite I
Anaheim, CA 92806 (714) 630-3622
13604 Ventura Boulevard
Sherman Oaks, CA 91423 (213) 501-3486
3216 Scott Boulevard
Santa Clara, CA 95051 (408) 980-1213

Orange Micro
PRINTER STORE

Limited Franchise Opportunities Now Available. Call (714) 630-3620.

© Orange Micro Inc. 1982

80 INPUT

Macro Assembler or you can re-assemble it directly using Radio Shack's Editor/Assembler.

The Guide mentions a do-file under the heading Other Features. This means we provide a series of patches to eliminate password protection from TRSDOS 2.0 and 2.0e system software. This enables the consumer to disassemble any system file as well as user files.

John Beckner
Program Innovations
Lumberton, NC

Buyer's Guide Omissions

The 1982 Buyer's Guide to Utilities (*80 Micro*, April 1982) omitted Elgen Systems' Stripper at $7.95 from the compressors category. This utility for the Color Computer reduces the size of my programs by 10–15 percent. The Guide also omitted their Editor/Assembler for the Color Computer at $6.95. They advertise with you so why not give them fair play?

David Roper
Garner, NC

As I noted in the Buyer's Guide, only those companies responding to my requests for information in time to meet publication deadlines were included.

Address	Change contents to:		
46B4B	FE	43	
46B6	28	06	
46B8	CD	42	3B
46BB	C3	DA	46
46BE	21	A2	47
4611	C3	28	47
4615	74	B6	
4618	49	BB	
4658	28	B8	
46BB	31	B2	46
46DA	31	B2	46
46DD	CD	F8	B1
4728	C3	B4	46
4742	C4	64	B2
4755	3B	B8	
4759	33	B8	
4D45	CD	64	B2
4D57	CD	96	B2
4D5A	CD	35	B2
4D6F	CD	35	B2
4D78	CD	35	B2
4D95	CD	35	B2
4DA6	CD	2C	B2
4DB3	CD	35	B2
4DBA	CD	35	B2
4F34	CD	B7	B2
4F39	CD	64	B2
4F3F	F4	64	B2
4F48	F4	64	B2
59AE	CD	64	B2
5982	CD	64	B2
5986	CD	64	B2
5CCC	CD	64	B2
5CD2	CD	64	B2

Figure 1

Keep in mind that there is a sizable lead time in the publication business (the Guide was typeset Jan. 3). It is futile to try to keep up with dozens of new companies as they pop up.—L.R.

EDTASM Patches

I have patched Radio Shack's EDTASM Ver. 1.2 to make it compatible with the Model III. The changes replace all driver routines with ROM calls. This shaves more than 750 bytes off the bottom of EDTASM and makes loading the program faster.

Figure 1 lists the changes you should make. They can be done with a monitor located in high RAM, such as a relocated T-Bug. When all changes are complete, punch a new tape as follows: 4604 5D40 468A EDTASM.

My thanks to John T. Blair (*80 Micro*, August 1980) for pointing me in the right direction, and Harold Zbiegien (*80 Micro*, September 1981) for adding the C command to EDTASM enabling selectable baud rate on tape loading and writing.

L.H. Fleming
Red Bluff, CA

MDX-2 Update

Ronald Cangro's review of the Micro-Design MDX-2 Interface Expansion Board (*80 Micro*, April 1982) was informative but contained a few serious errors. Mr. Cangro states: "The RS-232 port must be used for modem operation and is unavailable for other use." This is absolutely wrong. The serial port on the MDX-2 is a 110-9600 baud serial port that can operate RS-232 compatible and 20 milliampere loop devices. This includes serial printers, teletype machines and so on. The port is fully compatible with all Radio Shack and Radio Shack compatible software. I believe Mr. Cangro was trying to say that you may not use the serial port for the phone modem and another serial device at the same time. After all, it is only one serial port! If you plan to use the serial port for a serial device and the on board modem, you may install a switch in place of the jumpers provided. This allows you to switch between the two devices as you need them.

Mr. Cangro also states: "Technical assistance was only available after 5 p.m. Texas time." Micro-Design has two service centers to help with any problems the user may have with any of our products. Progressive Electronics in Lancaster, Ohio accepts calls for service from 8 a.m. to 11 p.m. EST! Also, we at Micro-Design are available for consultation.

Mr. Cangro states: "The floppy disk controller has a tendency for read and parity errors on the inner tracks. The circuitry is critical to disk alignment." The WD1771 used in the MDX-2 floppy disk controller circuitry (and also in the Radio Shack interface) does not give the greatest data separation, but we have found, through conversations with MDX-2 owners and our own experience with the systems on the market, that the MDX-2 gives a noticeably better performance in this area than the Radio Shack and LNW expansions! This leads me to believe Mr. Cangro may still have a problem with the alignment of his drives.

Michael B. Shapiro
Micro-Design
Manchaca, TX

Kudos

Kudos on your new products (boy, are they new) in the April (Fools') edition of *80 Micro*. With nearly 20 years in the editorial aids of the publishing biz, I have come to expect that editors occasionally take advantage of April editions to have some fun with otherwise serious subjects.

But rarely have I seen it done so well. I was halfway through "Database Alternative" before I realized how hard I had bitten. Followed by 10 minutes of some of the most uninhibited laughter I've expended on a magazine since I accidentally picked up the *Harvard Lampoon* version of *Time* about 12 years ago at a newsstand under the impression it was the real thing.

I don't see any reason why you have to limit it to an April issue; that's the kind of enlivening humor I would like to see in every issue of even the most serious magazine.

Don Picard, Editorial Supervisor
Custom Publications
St. Paul, MN

April Fools' edition? What April Fools' edition?—Eds.

Wrong Medicine

In their article "Worm Pills for Basic" (*80 Micro*, April 1982) Keen and Dischart claim PRINTUSING statements will execute faster if the fielded variable is assigned to a numeric variable before the Print statement.

The second part of their sample program does execute faster, but not for the

↙ See List of Advertisers on page 338

FREE

DISCOUNT & BONUS COUPONS

for
PRINTERS, DISK DRIVES, DISKETTES, SOFTWARE, BOOKS and MORE!

just circle 14

on your Reader Service Card and mail it today.

or write to:

FREE COUPONS
P.O. Box 32010
Cleveland, Ohio 44132

just good business...
joint marketing services

Up-to-the-minute information.

Down-to-earth prices.

Our low prices speak for themselves. Everything considered, we believe we offer you the best bottom line in the business — on a consistent basis.

However, we invite you to take advantage of more than just our low prices.

When you call Alpha Byte, you'll be tapping into what is possibly the most comprehensive wealth of information available anywhere.

Our salespeople are state-of-the-art experts who live and breathe microcomputers. We *require* that they stay on top of this constantly changing business — using the new products, reading the literature about them, understanding their applications, compatibilities, advantages, and disadvantages.

If you have any questions — if you're not sure about *exactly* what you need, or you'd like to discuss the pros and cons of a particular piece of equipment — call us. We love to talk microcomputers.

PRINTERS

ANADEX DP 9500	1295 00
ANADEX DP 9501	1295 00
C-ITOH F-10 40 CPS PARALLEL	1595 00
C-ITOH 45 CPS PARALLEL	1770 00
C-ITOH 40 CPS SERIAL	1295 00
EPSON MX-80 W/GRAFTRAX	$CALL
EPSON MX 80 F/T W/GRAFTRAX	$CALL
EPSON MX-100 W/GRAPHIC	$CALL
IDS-460G PAPER TIGER	945 00
IDS-560G PAPER TIGER	1195 00
IDS PRISM 80 W/O COLOR	1099 00
IDS PRISM 80 W/COLOR	1599 00
IDS PRISM 132 W/COLOR	1799 00
NEC 8023A	659 00
NEC SPINWRITER 3530 P RO	1995 00
NEC SPINWRITER 7710 S RO	2595 00
NEC SPINWRITER 7730 P RO	2595 00
NEC SPINWRITER 3500 SELLUM	2295 00
OKIDATA MICROLINE 80	389 00
OKIDATA MICROLINE 82A	549 00
OKIDATA MICROLINE 83A	799 00
OKIDATA MICROLINE 84	1199 00
OKIGRAPH 82	33 95

EPSON ACCESSORIES

MICROBUFFER MBS 8K	159 00
MICROBUFFER MBP 16K	159 00
GRAFTRAX	90 00
MX-80 RIBBONS	13 00
MX-80 PRINTHEAD	40 00
MX 100 RIBBONS	24 00
MX 100 PRINTHEAD	49 00
EPSON SERVICE MANUAL	30 00

16K RAM SPECIAL 13.95

Set of 8 NEC 4116 200ns Guaranteed one full year

MODEL I, III SOFTWARE

LAZY WRITER MOD I	169 00
LAZY WRITER MOD III	169 00
MICROPROOF SPELLING CHECK	84 95
PROSOFT NEWSCRIPT MOD I, III	99 00
PROSOFT MAILING LABELS MOD I, III	29 95
PROSOFT NEWSCRIPT/LABELS MOD I, III	115 00
SPECIAL DELIVERY MOD I, III	119 00
X TRA SPECIAL DELIVERY MOD I, III	179 00
TRAKCESS MOD I	24 95
OMNITERM SMART TERMINAL MOD I, III	89 95
MAXI-MANAGER MOD I, III	89 95
DOS PLUS 3 4 MOD I	89 00
DOS PLUS 3 4 MOD III	89 00
DOS PLUS 4 0 MOD I	129 00
DOS PLUS 4 0 MOD III	129 00
LDOS 5 1 MOD I, III	119 00
MICROSOFT EDITOR ASSEMBLER + MOD	24 95
MICROSOFT FORTRAN MOD I	165 00

DISKETTES

ALPHA DISKS 21 95

Single sided certified Double Density 40 Tracks with Hub-Ring Box of 10 Guaranteed one full year

VERBATIM

MD 525-01 10 16	26 50
MD 550-01 10 16	44 50
MD 557-01 10 16	45 60
FD 32 or 34-9000	36 00
FD 32 or 34-8000	45 60
FD 34 4001	48 60

DYSAN

5¼ SS/DD BOX OF 10	45 00

DISKETTE STORAGE

5¼ PLASTIC LIBRARY CASE	2 50
8 " PLASTIC LIBRARY CASE	3 50
PLASTIC STORAGE BINDER WITH INSERTS	9 95
PROTECTOR 5¼ "	21 95
PROTECTOR 8 "	24 95

TRS-80 MOD I HARDWARE

PERCOM DATA SEPARATOR	27 00
PERCOM DOUBLER II	159 00
TANDON 80 TRACK DISK DRIVE	429 00
TANDON 40 TRACK DISK DRIVE	289 00
LNW DOUBLER WITH DOSPLUS 3 4	159 00
LNW DOUBLER 5/8 WITH DOS PLUS	209 00

ISOLATORS

ISO-1 3-SOCKET	53 95
ISO 2 6 SOCKET	53 95

MODEMS

NOVATION CAT ACOUSTIC	145 00
NOVATION D-CAT DIRECT CONNECT	165 00
NOVATION AUTO CAT AUTO ANSWER	219 00
UDS 103 LP DIRECT CONNECT	175 00
UDS 103 JLP AUTO ANSWER	209 00
D C HAYES STACK Smart Modem	249 00
LEXICON LX-11	109 00

CP/M® SOFTWARE FOR MOD II

MICROSOFT

MICROSOFT BASIC-80	299 00
MICROSOFT BASIC COMPILER	319 00
MICROSOFT FORTRAN-80	369 00
COBOL 80	599 00

MICRO PRO

WORDSTAR*	310 00
MAILMERGE (REQUIRES WORDSTAR)*	110 00
SPELLSTAR (REQUIRES WORDSTAR)*	199 00
SUPERSORT*	195 00
DATASTAR*	245 00
CALCSTAR*	239 00

OTHER CP/M® SOFTWARE

SPELLGUARD	239 00
SUPERCALC	229 00
COMMX TERMINAL SOFTWARE	82 00
dBASE II	599 00
P & T CP/M* MOD II TRS-80	175 00
C BASIC 2	115 00
PASCAL Z	349 00
PASCAL MT +	439 00
PASCAL/M	205 00
SYSTEMS PLUS — G/L, A/R, A/P, P/R	1799 00
CONDOR I	579 00
CONDOR II	849 00

✓11

SUPPLIES

AVERY TABULABLES

1,000 3½ x 15/16	8.49
3,000 3½ x 15/16	14.95
5,000 3½ x 15/16	19.95

FAN FOLD PAPER (Prices F.O.B. S.P.)

9½ x 11 18lb WHITE 3,000 ct	29.00
14 7/8 x 11 18lb WHITE 3,000 ct	39.00

CORVUS

TRS-80 MOD I, II, III

Controller Case/P.S. Operating System A&T

5 MEGABYTES	3245.00
10 MEGABYTES	4645.00
20 MEGABYTES	5545.00
MIRROR BACK-UP	725.00

SPECIALS

SPECIAL NO. 1

TRS-80 DISK AND OTHER MYSTERIES BOX OF VERBATIM DISKS, PLASTIC LIBRARY CASE 44.50

SPECIAL NO. 3

NEWDOS/80 2.0, BOX OF VERBATIM DISKS PLASTIC LIBRARY CASE 149.00

SPECIAL NO. 4

MICROSOFT BASIC COMPILER, BOX OF VERBATIM DISKS PLASTIC LIBRARY CASE 179.00

SPECIAL NO. 5

MICROSOFT BASIC DECODED AND OTHER MYSTERIES BOX OF VERBATIM DISKS PLASTIC LIBRARY CASE 49.95

DOUBLE DENSITY SPECIAL

PERCOM DOUBLER II, NEWDOS/80, BOX OF VERBATIM DISKS PLASTIC LIBRARY CASE 279.00

COMMUNICATION SPECIAL MOD I & III

NOVATION MODEM, OMNITERM TERMINAL SOFTWARE

ACOUSTIC SPECIAL (CAT)	219.00
DIRECT CONNECT SPECIAL (D-CAT)	239.00
SERIAL CABLE	25.00

DISK LIBRARY SPECIAL

RACET DISKCAT CATALOGING PROGRAM, FLIP SORT (50 DISK CAPACITY), 50 STICK-ON DISK LABELS 59.95

TWO NEW 'OTHER MYSTERIES' BOOKS

THE CUSTOM TRS-80	24.95
MICROSOFT BASIC FASTER AND BETTER	24.95

TRS-80 GAMES

All games are disk versions. Cassette versions may not be available

TEMPLE OF APSHAI	34.95
HELLFIRE WARRIOR	34.95
STAR WARRIOR	34.95
RESCUE AT RIGEL	24.95
CRUSH, CRUMBLE & CHOMP	24.95
INVADERS FROM SPACE	17.95
PINBALL	17.95
STAR TREK 3.5	17.95
MISSILE ATTACK	18.95
STAR FIGHTER	24.95
Z CHESS III	24.95
ADVENTURE NO. 1, 2, & 3	34.95
ADVENTURE NO. 4, 5, & 6	34.95
ADVENTURE NO. 7, 8, & 9	34.95
DUEL-N-DROIDS	17.95
STARFLEET ORION	21.95
INVASION ORION	21.95
OLYMPIC DECATHLON	24.95
MONTY PLAYS MONOPOLY	31.95
SARGON II	31.95
BLACKJACK MASTER	27.95
ROBOT ATTACK	17.95
GALAXY INVASION	17.95
SUPER NOVA	17.95
TUESDAY MORNING QUARTERBACK	26.95
LUNAR LANDER	18.95
THE MEAN CHECKER MACHINE	21.95
GAMMON CHALLENGER	18.95
SPACE ROCKS	18.95
PIGSKIN	17.95
ZOSSED IN SPACE	18.95
ARCADE-80	21.95
COMBAT	18.95
SPACE INTRUDERS	17.95
SILVER FLASH	17.95
MORTON'S FORK	26.95
PROJECT OMEGA	21.95
SCARFMAN	17.95

Now you can use your Epson printer without wasting computer time.

Alpha Byte is proud to introduce the Microbuffer.™

Improve efficiency by adding a Microbuffer to your Epson printer.

Your computer is capable of sending data much faster than your Epson is capable of printing it. Because of this you and your computer spend a lot of time just waiting for the Epson to finish printing one line before the next can be sent.

You can recover this wasted time by installing the Microbuffer buffered Centronics-compatible parallel interface, from Practical Peripherals, Inc. It will allow you to print and process simultaneously by storing computer output in an external RAM buffer until the printer is ready for it. You regain control of the computer and may continue processing while the Epson is still printing.

MBP-16K PARALLEL INTERFACE - 16,394 BYTE BUFFER.....159.00

The MBP-16K Centronics-compatible parallel interface features a 16,394 byte buffer for data storage and is compatible with standard Epson cables. The MBP-16K supports all Epson printer commands and GRAFTRAX-80.

MBS-8K RS-232C SERIAL INTERFACE - 8,192 BYTE BUFFERING.....159.00

The MBS-8K is an RS-232 serial interface with an 8,192 byte buffer. The MBS-8K supports seven baud rates (300 to 19,200), hardware and X-On/X-Off handshaking, and user selectable UART settings. The MBS-8K supports all Epson printer commands and GRAFTRAX-80.

Both the Microbuffer MBP-16K and Microbuffer MBS-8K are easy to install, they simply plug into the existing auxiliary interface connector inside the Epson MX-80, MX-80 F/T, and MX-100 printers. It requires no special user software for control.

Alpha Byte COMPUTER PRODUCTS

We guarantee everything for 30 days. If anything is wrong, return the item and we'll make it right. And we'll pay the shipping charges.

We accept Visa and Master Card on all orders. COD orders, up to $300.00.

Add $2.00 for standard UPS shipping and handling on orders under 50 lbs. delivered in continental U.S. Call for shipping charges over 50 lbs. Foreign, FPO and APO orders, add 15% for shipping. Californians add 6% sales tax.

Prices quoted are for stock on hand and are subject to change without notice.

To order or for information call

(213) 706-0333

Modem order line: (213) 883-8976

31245 LA BAYA DRIVE, WESTLAKE VILLAGE, CALIFORNIA 91362

CP/M is a registered trademark of Digital Research. *Reg. trademark of Micro Pro International Corp.

reason they claim. They are assigning a double precision fielded variable to a single precision numeric variable and then printing the latter.

PRINTUSING formatting of double precision variables is notoriously slow; they achieve a speed increase by printing a single precision variable instead.

I found no speed difference between the two parts of their program when I maintained consistency of variable type. The speed difference between variable types was as expected.

Needless to say I was disappointed, since a little magic is always welcome.

Bob Penny
Boulder, CO

Error Trap

The correct price for the Microproof spelling checker reviewed by Michael Finefrock (*80 Micro*, April 1982) is $69, not $185.—Eds.

When I developed the name "Hiplot" for the program accompanying my article "Digital Doodles" (*80 Micro*, January 1982) I intended it to be an aid for remembering the contents of the program; i.e., a program for the plotter that uses the high end of memory. I didn't realize Bausch & Lomb had trademarked the name and had been using it since May 1978. I'll immediately cease using the name. My apologies to Bausch & Lomb for this infringement.—Alan Sehmer

---

The chart on page 141 of the 1982 Buyer's Guide to Utilities (*80 Micro*, April 1982) noted that Ultra-Mon lacked the ability to single-step through a program. This is in error; Ultra-Mon does single-step, displaying each disassembled instruction as it does so.

In addition, in the other features column, its ability to relocate itself and execute interpretively (emulating the ROM) was not mentioned. This feature was mentioned for our competition.—Mark C. Robinson, President, Interpro, Manchester, NH.

Service Data

As a microcomputer user, I find a fair share of the articles published in *80 Micro* of only a passing interest—not a complaint; just a statement of fact. For example, I didn't pay much attention to the disk drive buyer's guide published in the January issue. I already have two Percom drives for my Model I system and, at the time, was not considering buying more equipment.

Shortly after the January issue arrived, one of my drives stopped functioning properly. Since we have no repair services available in town, I contacted the Percom Data Co. They informed me it would take 2–4 weeks before they would be able to fix the drive. They suggested I send it to their nearest dealer. After contacting the dealer and being assured it would take no more than a week to fix the drive and return it to me, I blissfully sent it off. That was three months ago! I finally convinced the dealer to return the drive unrepaired (after I paid a $30 diagnostic fee).

What does this have to do with the disk drive buyer's guide? I believe an important piece of information is missing from the guide—service data (e.g., frequency of repair, service turnaround, and so on). As with any machine, a disk drive is going to need service no matter how good it is. *80 Micro* could provide a valuable service by compiling service data and including it in the next buyer's guide. It would have been a big aid to me recently. I just purchased my second micro system with one drive and service was a primary consideration in choosing a disk drive.

Jim Craig
Bowling Green, KY

Including service info in our buyer's guides is a good idea. Unfortunately, companies don't always follow through on their promises.—Eds.

Experience Is a Must

I'm writing in connection with James Keogh's advice to F.K. of Schenectady, NY (Input/Output, January 1982).

I've been a data processing professional for many years and have designed, programmed and installed on-line and batch systems utilizing large main-frame computers.

A year ago I contracted to implement a Vehicle Tracking System for a businessman involved in the brokerage of wrecked automobiles. The system involves 17 on-line screen transactions and a file where each vehicle record is 756 characters long and contains 91 fields. I have developed my own access method, a "main-index" resident in memory and a separate index file. I have done this in Basic on a TRS-80 Model II.

The businessman needs someone who knows how to design a business system and knows a high level computer language. No matter what language is used the system must be designed for the business' needs. In my experience, "local university students...or professors looking to moonlight..." are excellent for designing compilers and for saving 8 microseconds with some inventive routine but they have never had the experience of implementing a business system. This is an art which requires experience in design and an understanding of the man/machine interface.

My advice to F.K. is to stay away from the university's engineering and mathematics departments and approach someone who has worked for a large business as a programmer/analyst for at least three years and, most important, someone with whom the businessman can communicate. The main reason for failure in data processing is system design, not programming.

Bob Miller
New York, NY

Sour Lemons

Radio Shack CTR-41 owners who have purchased a LemonAid Loader will be interested in the following modification to their recorders. Without the modification, some CTR-41s may not reliably load weak tapes, or tapes with minor hits, even with the Loader installed. Originally we did not recommend using the LemonAid Loader with the CTR-41.

Fortunately, the modification is easy. Just add one resistor and the CTR-41 works as well as the CTR-80 or 80A which need no modifications. For detailed instructions contact us at the address below.

Wayne Lemons
Lemons Tech Services
M.P.O. Drawer 429
Buffalo, MO 65622

Chase Those Problems Away

Some readers have experienced problems with my program Subchaser (*80 Micro*, March 1982). The program begins

Scanned by Ira Goldklang - www.trs-80.com

and then crashes with an "FC Error in 200" message. Line 200 draws a line and then comes to the command PLAY L$. In line 150 L$ is defined as "T255O4;AF. The problem is that some readers are entering the letter O as a zero. The Play command is to play at a tempo (T) of 255, octave (O) 4. The computer cannot play a note at a tempo of 25504, so the error message is created.

I have also found that a dual dimensioned array is not required for proper operation of the program. You can change the beginning of line 10 from CLEAR5 to CLEAR200 and change line 20 to DIM S(41),S1(28),S2(28):D = 0.

John Steiner
Riverside, ND

Conquer the World

There is a flaw in Adventure International's game Armored Patrol. Find the opening in the mountain and drive straight to it. Then make a 180 degree turn and back up into it until you hit the zone limit. Sit there and wait for the robots and tanks. When the enemy tank shoots at you turn to avoid the bullet. It will miss you even if it is straight at you. My top score is 317,000. I could have made a higher score but I got tired of playing because it was so easy.

Todd Anderson
Fayetteville, NC

By golly, Todd, you're right about Armored Patrol. Our high score jumped from 50,000 to 281,000 in one short afternoon—and editor Caron Taylor's coffee cup got most of it (see Photo 1). Sort of like shooting fish in a barrel, though.—Eds.

COM Systems

I just read the article entitled "Technological Destiny—Part I" (*80 Micro*, April 1982) and was rather amused at the section that dealt with COM units. I have been working with COM systems for more than 11 years and I am quite sure no system could create film at the rate of 214 million characters per second. As a matter of fact there is no device available which could deliver that data to the COM system at that rate.

The systems available on the market today fall into two categories. Most use a CRT to expose the film; the others use a laser, which, I suppose, is the pencil of light noted in the article.

Most COM systems use a reduction ratio of 48K, which allows 269 data pages to be placed on a single 4-by-6 inch piece of film. There are other common reductions available (24X, 42X, and 72X). At 72X the user can store more than 600 data pages on a microfiche.

COM systems generally create film at a rate of 2–3 pages per second, or in terms of characters, about 25,000. (A page usually contains 132 characters per line, and 64 lines.)

This is much faster than line printers, but falls into the same speed category as laser printers such as the IBM 3800 or the Xerox 9700. These devices were completely overlooked in the article.

Russell Fine,
Product Manager
COM and Duplicator Systems
NCR Micrographic Systems Inc.
Mountain View, CA

Greater Winnings

I made two changes to "The Trade Wins" stock market simulation game (*80 Micro*, February 1982) to make it more enjoyable. I am a commodity broker and consider selling short to be as acceptable as buying long. If you eliminate lines 370, 380 and 390 the program will allow for short sales.

I also included a ¼-second time delay to slow the high speed market action. This allows the player to visualize the trend (if there is one). To insert the time delay add two lines between lines 270 and 280; I used:

```
273 FOR Q = 1 TO 80
275 NEXT Q
```

This yields approximately a ¼-second delay. Use a number greater than 80 for a longer delay and a number less than 80 for a shorter delay.

J. Richard Tygrest
Hopewell, VA

80-Grafix Aid

Owners of the Programme International 80-Grafix programmable character board for the Model I now have someone to turn to. Since Programme is no longer in business, we at Micro-Labs Inc., the designers of the board, have decided to help the several thousand graphics board owners. A number of character programming and design utilities, pre-defined character sets, a graphics Basic, and games are now available for the 80-Grafix. An improved version of the board is also available for the Models I and III. We encourage all 80-Grafix owners to send us their name and address for free program updates and relevant information.

Ted Carter
Micro-Labs Inc.
902 Pinecrest Drive
Richardson, TX 75080

Photo 1

WHY IS THE ALPHA JOYSTICK SUCH A SUCCESS ?

Because of games like these.

THE LATEST BLAST FROM BIG FIVE...

NEW! **DEFENSE COMMAND**

Actual unretouched photos

DEFENSE COMMAND NEW!

Big Five has done it again! Now the most popular arcade game of all time has a fascinating new twist. The Invaders are back! You are alone, valiantly defending the all important nuclear fuel cannister stockpile from a convoy of thieving aliens who repeatedly break off and attack in precision formations. An alien passes your guard, swiftly snatching up a cannister and flying straight off. Quick! you have one last chance to blast him out of the sky. Great action and sound!

BEST SELLER

SCARFMAN

SCARFMAN BEST SELLER

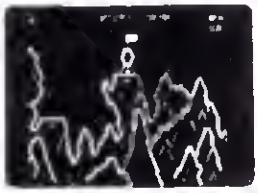
THE LATEST ARCADE CRAZE now runs on your TRS-80.

It's eat or be eaten. You control Scarfman around the maze, gobbing up everything in your path. You attempt to eat it all before the monsters devour you. Difficulty increases as game progresses. Excellent high speed machine language action game. From The Cornsoft Group. With sound.

CAUTION: Played with the Alpha Joystick, Scarfman may become addictive.

SUPER NOVA®

Asteroids float ominously around the screen. You must destroy the asteroids before they destroy you! (Big asteroids break into little ones.) Your ship will respond to thrust, rotate, hyperspace and fire. Watch out for that saucer with the laser! As reviewed in May 1981 Byte Magazine



LUNAR LANDER

As a vast panorama moonscape scrolls by, select one of many landing sights. The more perilous the spot, the more points scored — if you can land safely. You control LEM main engines and side thrusters. Absolutely the best use of TRS-80 graphics we have ever seen! From Adventure International. With sound.

ATTACK FORCE™

As your ship appears on the bottom of the maze, eight alien ships appear on the top, all traveling directly at you! You move toward them and fire missiles. But the more aliens you destroy, the faster the remaining ones become. If you get too good, you must endure the "Flagship". With sound effects!

COSMIC FIGHTER

Your ship comes out of hyperspace under a convoy of aliens. You destroy every one. But another set appears. These seem more intelligent. You eliminate them, too. Your fuel supply is diminishing. You must destroy two more sets before you can dock. The space station is now on your scanner. With sound!

METEOR MISSION II®

As you look down on your view, astronauts cry out for rescue. You must maneuver through the asteroids & meteors. (Can you get back to the space station?) Fire lasers to destroy the asteroids but watch out, there could be an alien FLAGSHIP lurking. Includes sound effects!

TALKING ROBOT ATTACK

INCREDIBLE! This amazing game actually **TALKS** without a speech synthesizer, through the cassette AUX plug.

You are armed with just a hand held laser. In a remote section of the space station you encounter armed robots, some march towards you, some wait around corners. Watch out, the walls are electrified. Zap as many robots as you dare before escaping into a new section where more robots await you. The struggle continues. With Joystick action and **VOICE OUTPUT**, this game will amaze you.

VOICE OUTPUT!

GAME PRICES

16K Level 2, Mod 1 + Mod 3 Cassette: $15.95
32K Level 2, Mod 1 + Mod 3 Diskette: $19.95
All games on this page are "Alpha Joystick Compatible." They may be played with or without joystick (using arrow keys).

Toll Free Order Line

(800) 221-0916

ALPHA Products

79-04 Jamaica Ave., Woodhaven, N Y 11421 (212) 296-5916

ADD $2.00 PER ORDER FOR SHIPPING AND HANDLING
WE ACCEPT VISA, MASTERCARD, CHECKS, M.O.
C.O.D. ADD $3.00 EXTRA.
NY RESIDENTS ADD SALES TAX.
OVERSEAS, FPO, APO ADD 10%.
DEALER DISCOUNTS AVAILABLE.

A Sweet Deal :

When you buy an Alpha Joystick and games together, deduct up to $14.00 from your order.

(Model I version shown)

MODEL 1 OR 3

ONLY $39.95

MODEL I OR III SPECIFY WHEN ORDERING PRICE INCLUDES ATARI JOYSTICK + ALPHA INTERFACE + INSTRUCTIONS + DEMO PROGRAM LISTING

THE ALPHA JOYSTICK

Joystick + 1 game : Deduct $ 6.00
Joystick + 2 games: Deduct $12.00
Joystick + 3 games: Deduct $14.00

The Alpha Joystick gives you real arcade action. Game producers know that it makes great games better. That's why each month more games from more producers are "Alpha Joystick Compatible."

There has never been a better time to get your Alpha Joystick. With so many excellent action games to choose from it's time to step up to joystick power.

You will find the Alpha Joystick simple to use. Just plug it in. No modification, wiring or batteries are required, and it's fully compatible with any other TRS-80 accessories. The instructions are clear and complete, we even show you how easy it is to experiment in BASIC (A = INP(0) reads stick) and to convert BASIC programs for joystick control.

MODEL I - Plugs into any Level II keyboard (40 pin card edge in the back) or expansion interface (left side, next to printer port). Our latest design has a "mode" switch for compatibility with the many different producers of joystick compatible games.

MODEL III — Works with any Model III BASIC system. It plugs into the 50 pin I/O bus (largest edge connector underneath, centered toward the rear). It will work with "Joystick Compatible" Model III games from any producer.

"If you purchase Alpha's Joystick you get the exquisite pleasure of enjoying (action games) to the limit of arcade-style realism."

– 80 Microcomputing
80 Reviews, Jan '82

14 DAY MONEY BACK GUARANTEE: If you are not delighted, return it within 14 days for a prompt and courteous refund.

Toll Free Order Line

ORDERS ONLY HOURS 9 AM 5.30 PM E S T
FOR INFO CALL: (212) 296-5916

800-221-0916

ADD $2.00 PER ORDER FOR SHIPPING AND HANDLING.
WE ACCEPT VISA, MASTERCARD, CHECKS, M O
C O D. ADD $3.00 EXTRA
NY RESIDENTS ADD SALES TAX
OVERSEAS, FPO, APO ADD 10%.
DEALER DISCOUNTS AVAILABLE

VISA MasterCard

ALPHA Products

79-04 Jamaica Ave., Woodhaven, N Y 11421 (212) 296-5916

MONEY DOS
an operating system for financial survival

by J.M. Keynes

"I speak of the biggest tax break in history: the Universal Individual Retirement Account."

The Economic Recovery Tax Act of 1981 includes a provision that touches the life of every working American. This legislation provides a pension opportunity for every individual under the age of 70½ who has earned income, whether or not covered by another Corporate, Keough, or government retirement plan. I speak of the biggest tax break in history: The Universal Individual Retirement Account. You may not be able to retire to the likes of my 15 bedroom mansion in Palm Beach, but you can assure yourself a glorious retirement, free from financial worry. Before counting our profits, we must understand how the IRA works.

The major advantage of an IRA plan is the tax benefit. All of your allowed contributions are 100 percent tax deductible, which leaves you with more money to invest toward your retirement years. In addition, all capital gains, dividends and interest accumulate on a tax-deferred basis. You will not be required to pay any taxes on your IRA earnings until you distribute them. By then you will likely be in a lower tax bracket. Also, depending on how the proceeds are paid out, they may be excluded from your estate for estate tax purposes.

"This legislation provides a pension opportunity for every individual under the age of 70½ . . ."

Putting It In

Contributions of 100 percent of earned income up to a maximum of $2,000 may be made to your IRA up until the due date of your tax return (including extensions), usually April 15th.

If both you and your spouse work and are under age 70½, you each may set up your own IRA plan for a potential deduction of $4,000 per year for the two of you.

If there is a non-working spouse, you can contribute and deduct up to an additional $250 each year. The only requirement is that the non-working spouse's contribution be placed in a separate account, and the total amount must be split so that neither spouse receives more than $2,000.

Getting It Back

IRA funds may be withdrawn at any time. However, distributions before age 59½ will be subject to a 10 percent non-deductible tax penalty as well as ordinary income tax. In the event of disability or death, you or your spouse will have access to the funds at any age without penalty. Withdrawals must begin at age 70½. You may take the distributions as a lump sum or in periodic payments. Distributions are treated as ordinary income and qualify for the general income averaging calculation. At death, IRA distributions to heirs taken in a scheduled periodic with-

```
10 REM  WRITTEN BY J.M. KEYNES
20 Q$="*******"
30  CLS: INPUT"YEARLY I.R.A. CONTRIBUTION";A:IFA<100,A=2000
40 INPUT"ESTIMATED AVERAGE YEARLY INTEREST RATE (ENTER 12% AS 12
)";I: R=I
50 INPUT"ESTIMATED TAX BRACKET (35% ENTERED AS 35)";TX:TB=TX:TB=
(100-TB)/100
60 INPUT"WANT PRINTOUT 1=YES";LP
70 CLS: R1=(R*TB)/100+1 :R=R/100+1: W=0: W1=0: T=A: X=A: X1=A*TB
: U=X1
80 REM NOTE: TAXABLE CONTRIBUTION IS REDUCED BY TAX PAID ON IRA
AMOUNT
90 PRINT@64,"FUTURE VALUE OF YOUR I.R.A. ACCOUNT VS. TAXABLE INV
ESTMENT
100 PRINT"YEARLY INVESTMENT OF $";A;" TO IRA  $";X1;" TO REGULAR
 SAVINGS
110 PRINT"COMPOUNDED @ ";I;"% YEARLY,  AVERAGE TAX BRACKET=";TX;
"%":PRINT
120 PRINT"YEAR #","$ CONTRIBUTED","   IRA","TAXABLE": PRINT
130 FORQ=1TO40: T=(T+W)*R: V=V+A: W=X :U=(U+W1)*R1: W1=X1
140 E=E+1: IFE=5 THEN E=0: PRINTQ,V,;: PRINTUSINGQ$;T;: PRINT"
     ";:PRINTUSINGQ$;U
150 IFLP=1THEN LPRINTQ,V,T,U
160 NEXT: PRINT: INPUT"TRY AGAIN ?  PRESS 'ENTER'";L: CLEAR: GOT
O20
```

Figure 1

FUTURE VALUE OF YOUR IRA ACCOUNT VS TAXABLE INVESTMENT. YEARLY INVESTMENT OF $2000 TO IRA, $1500 TO REGULAR SAVINGS COMPOUNDED @ 13% YEARLY, AVERAGE TAX BRACKET = 25%

YEAR #	$ CONTRIBUTED	IRA	TAXABLE
5	10000	14645	10001
10	20000	41629	25925
15	30000	91343	51280
20	40000	182940	91653
25	50000	351700	155939
30	60000	662630	258302
35	70000	1235500	421292
40	80000	2290970	680821

FUTURE VALUE OF YOUR IRA ACCOUNT VS TAXABLE INVESTMENT YEARLY INVESTMENT OF $2000 TO IRA, $1500 TO REGULAR SAVINGS COMPOUNDED @ 15% YEARLY, AVERAGE TAX BRACKET = 25%

YEAR #	$ CONTRIBUTED	IRA	TAXABLE
5	10000	15507	10444
10	20000	46699	28243
15	30000	109435	58574
20	40000	235620	110261
25	50000	489424	198343
30	60000	999913	348445
35	70000	2026690	604236
40	80000	4091900	1040130

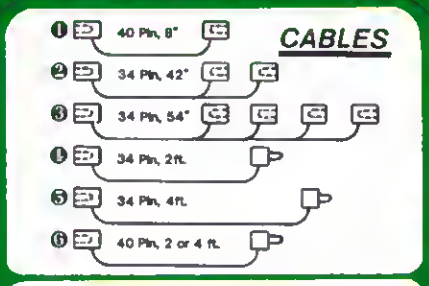
Figure 2

NOW MODEL I AND MODEL III!

Now Model III users can take advantage of the ALPHA I/O system too. Our new MOD III/I BUS CONVERTER allows most port based Model I accessories (such as our ANALOG-80, INTERFACER 2 and INTERFACER-80) to connect to the Model III bus. MOD III/I BUS CONVERTER, complete with all connectors, only $39.95.

PRINTSWITCH

Have 2 printers on line at all times and select printer 1 or 2 by means of a conveniently located switch. End the problem of constantly plugging and unplugging printer cables. PRINTSWITCH is a compact module that plugs onto the parellel printer port of your TRS-80 and provides an edge connector for each of your two printers. It works with any two types of printers: dot matrix, daisy wheel, plotters, TRS-80 converted selectrics, etc. Assembled, tested, ready to use with connector and instructions. For Model I or III (please specify). ONLY $59.00

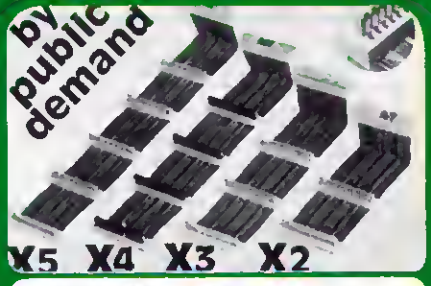


SUPERIOR QUALITY REPLACEMENT & EXTENSION CABLES

Highest quality cable and high force, gold plated contacts ensure the utmost in connection reliability

1	KEYBOARD TO EXPANSION INTERFACE	$21
2	DISK DRIVE CABLE FOR 1 OR 2 DRIVES	$32
3	DISK DRIVE CABLE FOR 3 OR 4 DRIVES	$45
4	DISK DRIVE CABLE EXTENDER	$22
5	PRINTER CABLE EXTENDER	$24
6	40 PIN BUS EXTENDER — 2 ft $22 4 ft	$24

Custom cable configurations are also available. Call us

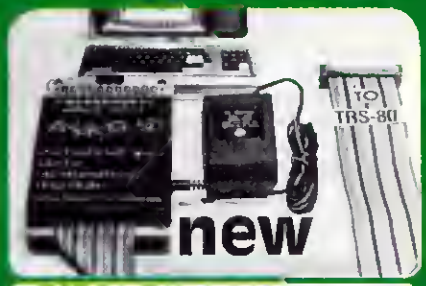


YOU ASKED FOR IT "EXPANDABUS" X1, X2, X3 AND X4

CONNECT ALL YOUR TRS-80 DEVICES SIMULTANEOUSLY on the 40 pin TRS-80 bus. Any device that normally plugs into the keyboard edge connector will also plug into the EXPANDABUS. The "X4" is shown with protective covers (included). The TRS-80 keyboard contains the bus drivers (74LS367) for up to 20 devices, more than you will ever need. Using the E/I, it plugs either between KB and E/I or in the Screen Printer port. Professional quality, gold plated contacts. Computer grade 40 conductor ribbon cable.

X2 $29 X3 $44 X4 $59 X5 $74

Custom configurations are also available, call us



ANALOG-80: A WORLD OF NEW APPLICATIONS POSSIBLE

8 DIGITAL MULTIMETERS PLUGGED INTO YOUR TRS-80™! Measure Temperature, Voltage, Current, Light, Pressure, etc. Very easy to use: for example, let's read input channel #4: 10 OUT 0,4: Selects input #4 and also starts the conversion 20 A = INP(0): Puts the result in variable "A". Voila! Specifications: Input range: 0-5V to 0-500V. Each channel can be set to a different scale.

Resolution: 20mV (on 5V range). Accuracy: 8 bits (.5%). Port Address: jumper selectable. Plugs into keyboard bus or E/I (screen printer port). Assembled and tested. 90 day warranty. Complete with power supply, connector, manual. $139

TIMEDATE 80: REAL-TIME CLOCK/CALENDAR MODULE

Keeps quartz accurate time for 3 years on 2 replaceable AAA batteries (not included). Gives MO, DAT, YR, DAY of WEEK, HR, MIN, SEC and AM, PM. Features INTELLIGENT CALENDAR and even provides for Leap Year. This compact module simply plugs into rear of keyboard or side of Expansion Interface (may be shipped inside E.I). Includes cassette software for setting clock and patching to any DOS including NEWDOS 80, 2.0). Optional "Y" connector allows for further expansion. For Model I. Fully assembled and tested. Complete with instructions and cassette. ONLY $95.00. Y option add $12.00

GREEN SCREEN WARNING

IBM and all the "biggies" are using green screen monitors. Its advantages are now widely advertised. We feel that every TRS-80 user should enjoy the benefits it provides. But **WARNING**: all Green Screens are not created equal. Here is what we found:

- Several are just a flat piece of standard colored Lucite. The green tint was not made for this purpose and is judged by many to be too dark. Increasing the brightness control will result in a fuzzy display.
- Some are simply a piece of thin plastic film taped onto a cardboard frame. The color is satisfactory but the wobbly film gives it a poor appearance.
- One "optical filter" is in fact plain acrylic sheeting.
- False claim: A few pretend to "reduce glare." In fact their flat and shiny surfaces (both film and Lucite type) ADD their own reflections to the screen.
- A few laughs: One ad claims to "reduce screen contrast." Sorry gentleman but it's just the opposite. One of the Green Screen's major benefits is to increase the contrast between the text and the background.
- Drawbacks: Most are using adhesive strips to fasten their screen to the monitor. This method makes it awkward to remove for necessary periodical cleaning. All (except ours) are flat. Light pens will not work reliably because of the big gap between the screen and the tube.

Many companies have been manufacturing video filters for years. We are not the first (some think they are), but we have done our homework and we think we manufacture the best Green Screen. Here is why:

- It fits right onto the picture tube like a skin because it is the only **CURVED** screen **MOLDED** exactly to the picture tube curvature. It is Cut precisely to cover the exposed area of the picture tube. The fit is such that the static electricity is sufficient to keep it in place! We also include some invisible reusable tape for a more secure fastening.
- The filter material that we use is just right, not too dark nor too light. The result is a really eye pleasing display.

We are so sure that you will never take your Green screen off that we offer an unconditional money-back guaranty. Try our Green Screen for 14 days. If for any reason you are not delighted with it, return it for a prompt refund.

A last word: We think that companies like ours, who are selling mainly by mail should list their street address, have a phone number (for questions and orders), accept CODs, not every one likes to send checks to a PO box, offer the convenience of charging their purchase to major credit cards. How come we are the only green screen people doing it?

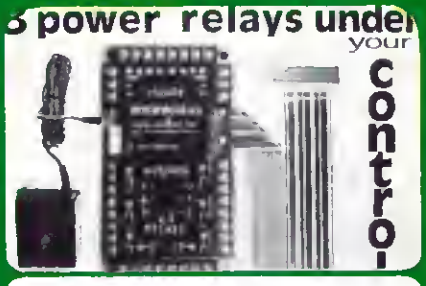
Order your **ALPHA GREEN SCREEN** today. $12.50

DISK DRIVE EXTENDER CABLE, FREE YOUR MINI-DRIVES.

End the daisy-chain mess once and for all. Fits all mini-drives: Percom, Aerocomp, Shugart, Micropolis, MTI, Vista, Pertec, Siemens, BASF. East to install: just remove the drive cover, plug in the EXTENDER CABLE and replace the cover.

Now you can change and move your drives without disassembly. Keep the cover on and the dust out. High reliability gold plated contacts, computer grade 34 conductor cable. Tested and guaranteed.

Get one for each drive ONLY $8.95



INTERFACER-80: the most powerful Sense/Control module

- 8 industrial grade relays: single pole, double throw, isolated contacts: 2 Amp @ 125 Volts. TTL latched outputs are also accessible to drive external solid state relays.
- 8 convenient LEDs constantly display the relay states.
- Simple "OUT" commands (in basic) control the 8 relays.
- 8 optically-isolated inputs for easy direct interfacing to external switches, photocells, keypads, sensors, etc. Simple "INP" commands read the status of the 8 inputs. Selectable port address. Clean, compact enclosed design. Assembled, tested, 90 days warranty. Price includes power supply, cable, connector, superb user's manual. $159

ALPHA Products

17

ADD $2.50 PER ORDER FOR SHIPPING AND HANDLING
ALL ORDERS SHIPPED FIRST CLASS MAIL
WE ACCEPT VISA, MASTER CHARGE, CHECKS, M.O.
COD, ADD $2.00 EXTRA
QUANTITY DISCOUNTS AVAILABLE
N.Y. RESIDENTS ADD SALES TAX

73-04 Jamaica Ave., Woodhaven, N.Y. 11421 ☎ Info and order: (212) 296•5916

CompuServe: What's in it for the 80s?

Plenty! First there's MNET80, a Special Interest Group (SIG) of TRS-80* users on the CompuServe Information Service. SIGs are active and growing groups of individuals who share a common interest and form an "electronic" club using the CompuServe Information Service as its communications medium. Share advice and exchange information with other TRS-80 users across town or anywhere around the country. TANDY services include an electronic newsletter, answers to your questions directly from Ft. Worth, product availability, tips and hints.

Secondly, we think you'll like the CompuServe Information Service: CB simulation, electronic mail, news wires, financial information, games, data bases, programming languages, big mainframe computer power and free data storage. All for a basic charge of only $5.00 an hour nights and weekends. All you need is your TRS-80, a modem and some inexpensive software. See a free demonstration of CompuServe in action at your Radio Shack* Computer Center. CompuServe Information Service, 5000 Arlington Centre Blvd., Columbus, Ohio 43220. (614) 457-8650.

CompuServe

235

ESTATE PLANNING MODEL SAVE TIME AND MONEY

by using your TRS-80* Model II, 64 K computer for professional estate analysis.

- ☆ **Marital Deduction Formula Analysis Reports** analyze six formula bequests for both husband and wife for both orders of death.
- ☆ **Estate Tax Return Report** computerizes estate tax planning for decedents' estates.
- ☆ **Client-Ready Reports** printed.
- ☆ **State** (Ohio) **and Federal Taxes** computed.
- ☆ **Free Updates** to reflect legislative changes for one year.
- ☆ **Sold and maintained by author:** an attorney and estate planning professional.
- ☆ **ALREADY REVISED** to comply with 1981 TAX REDUCTION ACT.

YES, please send me more information on the **Estate Planning Model.**

Name _____

Name of Firm _____

Street _____

City _____ State _____ Zip _____

Mail to: Beard Software Development Co.
59 Skyline Avenue
Canfield, Ohio 44406

*TRS-80 is a trademark of Tandy Radio Shack.

134

MONEY DOS

drawal over 36 months or more normally are not subject to federal estate taxes.

The Rollover

If you receive a lump-sum distribution from a qualified retirement plan it can be "rolled over" into an IRA. By doing so, current taxation is deferred. The essential requirement is that the IRA be set up within 60 days after receipt of the lump-sum.

Investment Options

Contrary to what you may have heard, your IRA investments are not limited to savings accounts. You may begin your IRA or rollover a low yielding existing IRA to one of several major investment firms who will act as custodian, thereby giving you the alternative of choosing the investment which suits you best. If you are currently earning less than 15 percent on your IRA, you are losing money because, as this is written, you can get 15 percent, and it is guaranteed by the U.S. Government.

In past columns I have spoken of how

"Contrary to what you may have heard, your IRA investments are not limited to savings accounts."

negligent most investors are. Run the program in Fig. 1 and you will see the difference between 13 percent and 15 percent over the years. See in Fig. 2 how only 2 percent more = $862 additional profit in 5 years...$1.8 million additional in 40 years...Hmmmmmm...perhaps you will retire in a mension.

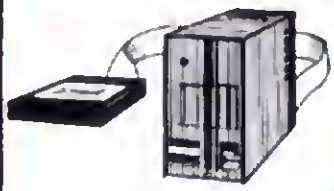
If you have further questions, you may call the brightest member of my staff, Evone, and she will answer them. Please call between 1 p.m.-4 p.m. (E.S.T.) Mon.-Fri., 1-800-327-3389. In Florida, call 305-659-4017 (Palm Beech).

Next month I will discuss life insurance and show you how to save up to 90 percent on your premium, and maintain the same or better coverage. The April column on covered option writing stimulated great interest. In future columns I shall discuss other option strategies. In the meantime the MONEY DOS weekend option report is available from Friday at 9 p.m. to Monday at 8 a.m. only at the above numbers. ■

Circle 18 on Reader Service card.

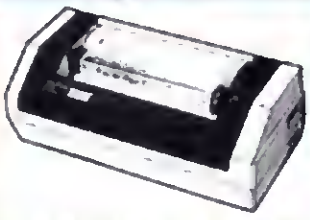
From Computer Plus to YOU . . .

PLUS after PLUS after PLUS



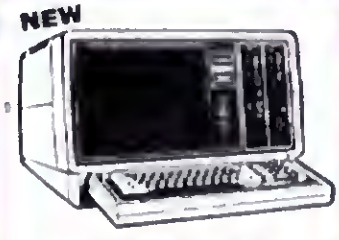
Color Computer Disc Drive $470

32K Exp. Int. $334



Line Printer VII $315

Color Computer 4K $310
w/16K Ext. Basic $459
w/32K Ext. Basic $525



Model 16 128K
1 Drive $4299

Model III 16K $839
Model III 48K
2 Disc & RS232C $2059

BUY DIRECT

Here are just a few of our fine offers . . . call TOLL FREE for full information.

COMPUTERS	
Model II 64K	$3300
Model III 4K LEV I	599
MODEL III 16K	839
MODEL III 32K	945.50
*MODEL III 32K	881.50
MODEL III 48K	1052
*MODEL III 48K	924
Model III 48K	
2 Disc & RS232 c	2059
†Model III 48K	
2 Disk No RS232 c	1799
Color Computer 4K	310
Color Computer 16K	
w/extended basic	459
Color Computer 32K	
w/extended basic	525
‡Color Computer 32K-64K	
w/extended basic	489
Pocket Computer 2	230
Model 16 1DR 128K	4299
Model 16 2DR 128K	4999

PERIPHERALS	
*Expansion Interface 32K	334
16K RAM N.E.C. 200 N.S. chips	25
DT-1 Data Terminal	599
64K Ram Chips	75
MODEMS	
Lynx Direct Connect MI/MIII	235
Auto Ans./Dial	
Telephone Interface II	169
R.S. Modem I D.C.	130
R.S. Modem II D.C.	210
PRINTERS	
Daisy Wheel II	1695
Epson MX80	479
Epson MX80 FT	589
Epson MX100	759
Line Printer VII	315
Line Printer VIII	620
Line Printer V	1610
Microline 80	345
Microline 82A	479
Microline 83A	735
Microline 84 Parallel	1090
P. C. Platter Printer	199
DISK DRIVES	
R.S. Model III 1ST-Drive	712
Traxx Tandon 40 Track MI	289
R.S. 1 Drive Exp MII	999
Color Computer Drive 0	470
Primary Hard Disk	3999
SOFTWARE	
R.S. Software 10% off list	
Newdos 80 MIII	149
Color Computer Flex D O.S.	99
ETC.	
Verbatum 5" Double Density	32
Verbatum 8" Data Life	49.95
Ctr-80A recorder	52
C. C Joysticks	22

*Computer Plus New Equipment, with NEC RAM installed. 180 Day Computer Plus Warranty

†MIII R S. Drive 0 Tandon Drive 1

‡Color Computer 64K requires Disk 0 and Flex O O.S.

We have the lowest possible Fully Warranteed Prices AND a full complement of Radio Shack Software.

call TOLL FREE 1-800-343-8124

computer plus

245A Great Road
Littleton, MA 01460
617-486-3193

Write for your free catalog

DEALER INQUIRIES ARE INVITED

Prices subject to change without notice.
Not responsible for typographical errors

TRS-80 is a registered trademark of Tandy Corp.

80 ACCOUNTANT

by Michael Tannenbaum C.P.A.

"It is a mark of pride for many professionals to achieve a reputation as the 'highest' biller in the firm."

After I completed last month's column, I received a note from F. Lee Radzicki, President of IMPACC (developers of the Tax Master tax preparation program). IMPACC has resolved the "file open" problem which caused me difficulty and they ere working on a Model 16 implementation to be available prior to next tax season. Mr. Radzicki will also extend his excellent method of screen presentation to corporation tax return preparation next year. I inadvertently understated the cost of maintenance—system updates will be priced at $350.

The tax packages reviewed last month are good illustrations of special purpose software applications that are well suited to small business micros such as the Model II. Unfortunately, this is rarely true of the generalized business and accounting systems I have evaluated. Because these systems are designed for the largest possible market they often contain compromises in data acquisition, storage and presentation. Fortunately, the latest software offerings from Tandy reverse this trend. They have released a medical office system (#26-4505), a stock broker's system called the Electronic Broker (#26-4525), and a Time Accounting System (#26-4520). Other industry-specific systems are available in their current catalogue.

To see how well these new systems fit the Model II, I evaluated the Time Accounting System (TAS). I was interested to see how a time accounting system could be shoe-horned into a floppy-disk Model II. Our system requires an IBM 4331 with a staff of machine operators and programmers. To duplicate its involved functions on a micro seemed far-fetched.

Legal Problems

Legal time accounting systems have several unique problems. First, they are not entirely financial accounting systems. For a cash-basis taxpayer such as an attorney (or any other professional), a bill for professional services is an accounting non-event. Income is recognized only when cash is received. For the attorney who incurs non-time expenses and re-bills these expenses to his clients, the IRS requires that these cash outlays be segregated so that they do not affect income or expense.

Separate treatment of billable time and expenses has created unavoidable problems for designers of legal time accounting systems. In these systems billable disbursements must be classified as balance sheet items which do not affect period income. The system must keep careful control over these disbursements before and after billing, so cash received is properly applied. Misapplication of cash collections between time and disbursements will cause a misstatement of income for the period.

Legal time accounting systems are also often divided into two modules, a pre-billing module and an accounts receivable module. When billing is to be prepared, a summary of unbilled activity is developed by the pre-billing module. Often the receivable module is referenced to provide a total of amounts billed but not collected. When the billing attorney examines this report an invoice is prepared for an amount which may or may not agree with the details of unbilled activity to date. It is usually bookkeeping's responsibility to apply the amounts invoiced to the detail, relieve the pre-billing module's inventory and create an accounts receivable record.

Most legal time accounting systems generate reports, by attorney, of hours billed and collected. Because of the prestige and the income share to be earned these reports have enormous significance. It is a mark of pride for many professionals to achieve a reputation as the "highest" biller in their firm. Most keep careful independent records of their billing activities. This attention to billing accuracy usually results in many small adjustments as mispostings are corrected. Not all mispostings arise from operator error. Disagreements frequently arise as to which client is to be charged and in what amount.

In a large law firm, many attorneys with differing specialties may be required on a single matter. Although a specialist may not be the billing partner or associate on a matter, he is just as zealous in guarding the integrity of his time. Add this to charges for duplicating services and secretarial time, and the number of charge transactions that can accumulate in a legal time accounting system is enormous.

The Time Accounting System

The Time Accounting System offered by Tandy is aimed at the legal profession. For the reasons detailed above I am concerned that accounting for all the transactions indicated above could overburden a floppy-disk Model II. The manual indicates that the accounting system is designed to run on a three-drive system. As supplied, it can handle up to 14 employees, 1000 clients and 500 jobs or matters. There are provisions for up to 99 charge codes and the system will retain detail of up to 2950 transactions. Installed on a floppy-disk Model II, the system may provide inadequate storage to handle activity for 14 billing partners. Many courts are slow and thus may leave matters unresolved for months and years. Transactions will accumulate at an enormous rate. Exercise extreme care when projecting storage requirements prior to installing the system. Since the system runs on the hard disk unit, it may be desirable to put the system up on this device immediately regardless of the size of the firm. How this will effect the capacities indicated above is uncertain.

If a hard disk is used, all programs run much more quickly. This system is written in Cobol and in the floppy environment it runs *very* slowly. Unlike the three disk accounting systems reviewed earlier in the year, this system is supplied on a single disk. Therefore all system functions are accessible from menus without having to restart operations.

In common with all Tandy systems I have used in the past, the documentation is good and the programs are "user friendly." (User friendliness is relative to the user's experience. When running the system, I try to emulate an inexperienced

Convert to CP/M and Save

CP/M for the TRS-80

Converting to CP/M offers the TRS-80 owner many advantages. The TRS-80 immediately becomes capable of running twice the software of any other computer on the market. Perhaps more importantly, CP/M permits software portability. Unlike TRS-DOS programs, CP/M programs can be directly transferred to your next computer. The savings in time and software costs can be quite significant. CP/M conversion can easily pay for itself in the first few months. The sooner you convert to CP/M, the more you stand to save.

CP/M Acquires Unprecedented Support

Over the past year, a number of powerful competitors have introduced new microcomputers. Most people will instantly recognize the names of Xerox, IBM, Hewlett Packard, Digital Equipment, Wang and Zenith. The Japanese companies, NEC, Sanyo, Toshiba and Sharp, are equally well-known. Together, these companies have committed over a billion dollars to compete effectively in the micro market. TRS-80 owners should be aware that every one of these companies has chosen CP/M for their standard operating system. Over the next few years, these companies will sell millions of CP/M computers. Considering these facts, it is clear that CP/M is the operating system of the future.

Apple and Commodore Offer CP/M

In a recent press conference, the Apple Computer Company stated, "The largest installed base CP/M system in the world today is the Apple II with the Z80 card from Microsoft." In a recent full page ad in the Wall Street Journal, Apple announced CP/M for the Apple III. Commodore, refusing to be left behind, has recently announced their "Emulator" series of computers that support CP/M. There are even rumors that the new Tandy 16 will support a version of CP/M.

Software Development Follows the Market

The software market is rapidly changing. The proliferation of CP/M computers has produced a tremendous demand for CP/M software. This large and profitable market is attracting the best programmers from the rest of the computer industry. The newest and best software programs will support CP/M. Manufacturers that do not support CP/M will find it impossible to offer the software support necessary to compete effectively. CP/M will continue to gain support by virtue of a superior selection of quality software products.

Run CP/M on Your TRS-80

With the Omikron "Mapper" installed in your TRS-80, you can run both CP/M programs and TRS-DOS. You can continue to run all of your present software while you convert to CP/M. By the time you purchase your next computer, you will already have all of the CP/M software you will need. Also, by learning CP/M, you will have effectively mastered your new computer before you buy it. When you finally do purchase your new computer, your TRS-80 will have a new lease on life as a backup unit.

Compatibility Is the Key

Software compatibility offers the same potential that mass production offered the auto industry. Programs will continue to get better and cost less as the costs are averaged over more purchasers. When you purchase a "Mapper," you register your vote for software compatibility. Software standardization is the most effective answer to solving the software problem.

COUGAR . . . Omikron's Users Group

CP/M has always been the standard for business and professional use. This market has always demanded high quality and high performance. The high prices for CP/M programs reflect the additional effort required to develop top-quality software products. To help our customers afford CP/M software, Omikron has formed Cougar, our official users group. Through Cougar, Omikron can purchase software products in large volume. This allows us to offer our customers some of the best CP/M software in the industry at greatly reduced prices.

Omikron Puts It All Together

Omikron has sold more CP/M conversions than all of our competitors combined. Omikron was the first in the market with a CP/M conversion. Omikron has continued to lead the market for one simple reason—our total commitment to our customers. Only Omikron offers a "Works" type introductory package. Only Omikron has a "Cougar" type users group for long term savings. Our hardware has always been designed with reliability first. Our software is well designed, complete, and bug free. Our technical hot line assists those with problems. Finally, our exchange policy has enabled our customers to upgrade to our new designs for much less than the cost to new customers. When you buy from Omikron, you buy from a company with a proven record of dedication and success.

OMIKRON Products that set Precedents
1127 Hearst Street, Berkeley, CA 94702 (415) 845-8013

TRS-80™ Radio Shack/Tandy Corporation CP/M™ Digital Research ✓ 50

✓ See List of Advertisers on page 338

user by trying it without reading the documentation. Although this is a very bad way to run a system, it alerts me to confusing displays which may trap the new user.) During evaluation, I had no major problems and was able to get the system running, enter transactions and print an invoice.

Getting Started

To begin operations, you need a copy of the systems disk and two formatted disks. The documentation provides a complete procedure to make these copies. Once they have been prepared and inserted in the drives they are initialized by a set-up program called TASETUP. Running this program initializes all the disks and allows the user to customize the system's reports. By entering appropriate data, the firm's name and address will appear on statements and reports. References to employee, client and job can be changed to attorney, client and matter. You can activate a trust accounting module if desired. This module keeps track of trust receipts and disbursements.

Once you have completed the setup procedures, you can access the main system menu by entering TAS. You can select all system functions from this menu, including file maintenance for the reference files, transaction entry, billing, statistical reports, month-end closing procedures and display of trust fund balances. The system contains four main reference files: the employee file, client file, charge code file and job file. You must initialize the content of these files before you enter transactions into the system.

The individual entrusted with establishing the reference file must understand how the system will use the data. Many calculations are performed automatically when data is entered. If the data files have been established correctly, the results of these calculations will provide useful reports and accurate invoices. However, if the underlying data has not been entered with care, the system will be difficult to use and the resulting management reports may not be informative.

A case in point is the assignment of charge codes. As I indicated earlier, it is very important to distinguish between cash receipts for time and cash receipts for expenses. For example, you can specify separate payment charge codes for expenses and time. If you overlook this it will be difficult to separate receipts for accounting purposes. Be sure to describe charge codes adequately. Because of the way the system posts activity to employee earnings records, you may need a separate manual employee activity recordkeeping system to maintain accurate earnings records.

The system credits all activity on a client to the designated billing partner. If more professionals work on the same client, the additional professionals will not receive credits for their work. When a billing partner is changed, the old billing partner's earnings records properly show activity up to the transfer point. However, the monthly report of employee activity details the old billing partner's activity under the new billing partner's name. This makes the two reports inconsistent and confuses the user. The activity reports are most valuable in a firm where each professional handles all of a client's work without assistance.

The method used by this system to record statistics of activity performed for clients illustrates one of the potential limitations of industry-specific software. This system may not suit firms such as accounting or contract programming where different specialists may be involved in client activities. For these firms, the employee activity reports prepared by the system will be useless. When you are considering a system such as this, see how the system fits before purchasing it.

If the Time Accounting System fits the practice, it has real advantages over a manual or service bureau system especially when billing time approaches. In a manual system, the time and expense records have to be assembled, extended by a billing rate and summarized on a worksheet. All details have to be totaled and carefully checked for accuracy. Finally the billing partner has to examine the whole worksheet and accompanying documentation. Based on the total and agreements with the client, a billing amount has to be calculated. The wording of the invoice and the grouping of expenses into billable tasks often requires creative thinking which you have to communicate to the typist who actually prepares the invoice. Bill preparation in a time accounting environment is a time-consuming activity regardless of who types the final invoice.

The designers of the Tandy Time Accounting System have studied the problems of professional firms' invoicing procedures. The Time Accounting System handles the mechanics of creating a pre-billing work sheet. This procedure alone should save enough time to justify purchasing the system. The real benefits of computerization become apparent when preparing the client's statement. With almost any billing system, you could bill the contents of the pre-billing file without change; however, with this system you

Percom Disk Storage

Quality Percom products are available from the following authorized Percom retailers. If a retailer is not listed for your area, call Percom toll free at **1-800-527-1222** for the address of a nearby retailer or to order directly from Percom

ARKANSAS

MICROCOMPUTER SYSTEMS INC	Hot Springs	(501) 624-6209

ARIZONA

SIMOTEK	Tucson	(602) 624-9891

CALIFORNIA

ALPHA BYTE STORES	Calabasas	(213) 880-8594
BERKELEY MICROCOMPUTERS	Berkeley	(415) 848-7127
COMPUTER INFORMATION EXCHANGE	San Luis Rey	(714) 757-4849
HOBBYWORLD	Northridge	(213) 886-0200
RAY'S AND DON'S COMPUTERS	Whittier	(213) 695-3248

DISTRICT OF COLUMBIA

THE PROGRAM STORE	Washington	(202) 337-3691

FLORIDA

EN TRON INC	Largo	(813) 586-5012

GEORGIA

COMMERCIAL DATA PRODUCTS	Atlanta	(404) 325-7800

HAWAII

COMPUTER CENTER	Honolulu	(808) 488-2171

IDAHO

OFFICE MAGIC COMPUTERS	Boise	(208) 376-4613
IDAHO MICROCOMPUTER	Buhl	(208) 543-6292

KANSAS

BESCO ELECTRONICS	Shawnee	(913) 268-7838
SALES DATA	Hutchinson	(316) 665-3611
DATA SERVICES INC	Wichita	(316) 838-9021

MASSACHUSETTS

OMNITEK	Tewksbury	(617) 851-3580

MARYLAND

DAMASCUS C B	Damascus	(301) 253-2101

MICHIGAN

ALTERNATE SOURCE	Lansing	(517) 487-3358

MINNESOTA

THE CODE ROOM	Eden Prairie	(612) 934-1820

MISSOURI

LEMBERGER CO	Vienna	(314) 422-4553

NEBRASKA

CURTRONICS	Lincoln	(402) 423-7721

NEW HAMPSHIRE

THINK TANK	Portsmouth	(603) 431-1077
TSE HARDSIDE	Milford	(603) 673-5144

NEW JERSEY

CHANNEL 1 RADIO SHACK	Medford	(609) 654-7454
DA & D SALES	Bloomfield	(201) 751-8444

NEW YORK

D & E COMPUTRONICS	Spring Valley	(914) 425-1545
MICRO 80 SYSTEMS	Brooklyn	(212) 748-8246
PROGRAMS UNLIMITED	Jericho	(800) 645-6088
STONY CLOVE	New York City	(212) 675-1046
DATASCAN COMPUTER SYSTEMS INC	Farmingville	(516) 698-8285

NORTH CAROLINA

HOLLIDAY MFG	Greensboro	(919) 274-6540

OHIO

FELDMAN ENTERPRISES	Akron	(216) 724-6588

OKLAHOMA

ONLINE COMPUTER CENTER	Oklahoma City	(405) 751-2796

OREGON

PIONEER ELECTRONICS	Sandy	(503) 668-8866

PENNSYLVANIA

COMPUTER ANALYSTS	New Brighton	(412) 846-9324
SUNRISE ELECTRONICS	Chambersburg	(717) 264-8314

TEXAS

PERCOM COMPUTER CENTER	Richardson	(214) 680-0207
COMPUTER TO GO	Austin	(512) 472-8926
BREEZE QSD INC	Dallas	(214) 340-2976
TEXAS COMPUTER SYSTEMS	Arlington	(817) 274-9625

UTAH

MICRO MNEMONICS	Sunset	(801) 525-9017

VIRGINIA

BURCO DISTRIBUTORS	Richmond	(804) 222-1481

WASHINGTON

COMPUTER SERVICES	Kennewick	(509) 582-1729
NORTHWEST COMPUTER SERVICE	Bellevue	(206) 454-4979

WEST VIRGINIA

BURCO DISTRIBUTORS	Huntington	(304) 453-6867

WISCONSIN

BYTE SHOP MILWAUKEE	Greenfield	(414) 281-2044

FOREIGN DEALERS

AUSTRALIA

DICK SMITH ELECTRONICS P.O. Box 321 North Ryde NSW2113

CANADA

ALPHA ONE	Edmonton	(403) 454-8409
VALEROTE ANTI ASSOC	Guelph Ontario	(416) 624-4809
DRV COMPUTERS, LTD	Surrey B C	(604) 576-8535
COTS MICROSYSTEMS LTD	Ottawa	(613) 741-2937
MICRO COMPUTER ENTERPRISES INC	Pickering	(416) 839-4561
MICROMART	Montreal	(514) 270-1826

MEXICO

COMPUTADORAS Y ASESORAMIENTO

Rio Panuco 14 Mexico D.F.

DOMINICAN REPUBLIC

RADIO SHACK Santo Domingo (809) 565-0181

TRS-80* COMPUTING EDITION

©1981 Percom Data Co., Inc. — The Percom Peripheral — 35 cents

Percom's DOUBLER II™ tolerates wide variations in media, drives

GARLAND, TEXAS — May 22, 1981 — Harold Mauch, president of Percom Data Company, announced here today that an improved version of the Compaoy's innovative DOUBLER® adapter, a double-density plug-in module for TRS-80* Model I computers, is now available.

Reflecting design refinements based on both theoretical analyses and field testing, the DOUBLER II™, so named, permits even greater tolerance in variations among media and drives than the previous design.

Like the original DOUBLER, the DOUBLER II plugs into the drive controller IC socket of a TRS-80 Model I Expansion Interface and permits a user to run either single- or double-density diskettes on a Model I.

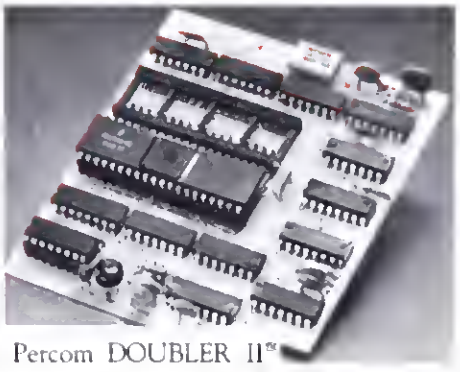
With a DOUBLER II installed, over four times more formatted data — as much as 364 Kbytes — can be stored on one side of a five-inch diskette than can be stored using a standard Tandy Model I drive system.

Moreover, a DOUBLER II equips a Model I with the hardware required to run Model III diskettes.

(*Ed. Note:* See "OS-80™: Bridging the TRS-80* software compatibility gap" elsewhere on this page.)

The critical clock-data separation circuitry of the DOUBLER II is a proprietary design *called a ROM-programmed digital phase-lock loop data separator.*

According to Mauch, this design is more tolerant of differences from diskette to diskette and drive to drive, and also provides *immunity to performance degradation caused by circuit component aging.*



Percom DOUBLER II™

Mauch said "A DOUBLER II will operate just as reliably two years after it is installed as it will two days after installation."

The digital phase-lock loop also *eliminates the need for trimmer adjustments typical of analog phase-lock loop circuits.*

"You plug in a Percom DOUBLER II and then forget it," he said.

The DOUBLER II also features a refined Write Precompensation circuit that more effectively minimizes the phenomena of bit- and peak-shifting, a reliability-impairing characteristic of magnetic data recording.

The DOUBLER II, which is fully software compatible with the previous DOUBLER, is supplied with DBLDOS™, a TRSDOS*-compatible disk operating system.

The DOUBLER II sells for ~~$2[illegible]95~~, including the DBLDOS diskette. NOW $169.95!

The Percom DOUBLER II is available from authorized Percom retailers, or may be ordered direct from the factory. The factory toll-free order number is 1-800-527-1222.

Ed. note: Opening the TRS-80 Expansion Interface may void the Tandy limited 90-day warranty. ↙1

All that glitters is not gold

OS-80™ Bridging the TRS-80* software compatibility gap

Compatibility between TRS-80* Model I diskettes and the new Model III is about as genuine as a gold-plated lead Krugerrand.

True, Model I TRSDOS* diskettes can be *read* on a Model III. But first they must be converted and re-recorded for Model III operation.

And you *cannot write* to a Model I TRSDOS* diskette. Not with a Model III. You cannot add a file. Delete a file. Or in any way modify a Model I TRSDOS diskette with a Model III computer.

Furthermore, your converted TRSDOS diskettes cannot be converted *back* for Model I operation.

TRSDOS is a one-way street. And there's no retreating. A point to consider before switching the company's payroll to your new Model III.

Real software compatibility should allow the *direct, immediate* interchangeability of Model I and Model III diskettes. No read-only limitations, no conversion-re-recording steps and no chance to be left high and dry with Model III diskettes that can't be run on a Model I.

What's the answer? The answer is Percom's OS-80™ family of TRS-80 disk operating systems.

OS-80 programs allow *direct, immediate* interchangeability of Model I and Model III diskettes.

You can run Model I single-density diskettes on a Model III, install Percom's plug-in DOUBLER™ adapter in your Model I, and you can run double-density Model III diskettes on a Model I.

There's no conversion, no re-recording.

Slip an OS-80 diskette out of your Model I and insert it directly in a Model III

And vice-versa.

Just have the correct OS-80 disk operating system — OS-80, OS-80D or OS-80/III — in each computer.

Moreover, with OS-80 systems, you can add, delete, and update files. You can read *and write* diskettes regardless of the system of origin.

OS-80 is the original Percom TRS-80 DOS for BASIC programmers.

Even OS-80 utilities are written in BASIC.

OS-80 is the Percom system about which a user wrote, in Creative Computing magazine, "...the best $30.00 you will ever spend."†

Requiring only seven Kbytes of memory, OS-80 disk operating systems reside completely in RAM. There's no need to dedicate a drive exclusively for a system diskette.

And, unlike TRSDOS, you *can* work at the track sector level, defining and controlling data formats — in BASIC — to create simple or complex data structures that execute more quickly than TRSDOS files.

The Percom OS-80 DOS supports single-density operation of the Model I computer — price is $29.95; the OS-80D supports double-density operation of Model I computers equipped with a DOUBLER or DOUBLER II; and, OS-80/III — for the Model III of course — supports both single- and double-density operation. OS-80D and OS-80/III each sell for $49.95. ↙3

Circuit misapplication causes diskette read, format problems.
High resolution key to reliable data separation

GARLAND, TEXAS — The Percom SEPARATOR™ does very well for the Radio Shack TRS-80* Model I computer what the Tandy disk controller does poorly at best: *reliably* separates clock and data signals during disk-read operations.

Unreliable data-clock separation causes format verification failures and repeated read retries.

CRC ERROR–TRACK LOCKED OUT

The problem is most severe on high-number (high-density) inner file tracks.

As reported earlier, the clock-data separation problem was traced by Percom to misapplication of the internal separator of the 1771 drive controller IC used in the Model I.

The Percom Separator substitutes a *high-resolution* digital data separator circuit, one which operates at 16 megahertz, for the low-resolution one-megahertz circuit of the Tandy design.

Separator circuits that operate at lower frequencies — for example, two- or four-megahertz — were found by Percom to provide only marginally improved performance over the original Tandy circuit.

The Percom solution is a simple adapter that plugs into the drive controller of the Expansion Interface (EI).

Not a kit — some vendors supply an untested separator kit of resistors, ICs and other paraphernalia that may be installed by modifying the computer — the Percom SEPARATOR is a fully assembled, fully tested plug-in module.

Installation involves merely plugging the SEPARATOR into the Model I EI disk controller chip socket, and plugging the controller chip into a socket on the SEPARATOR.

The SEPARATOR, which sells for only $29.95, may be purchased from authorized Percom retailers or ordered directly from the factory. The factory toll-free order number is 1-800-527-1222.

Ed. note: Opening the TRS-80 Expansion Interface may void the Tandy limited 90-day warranty. ↙2

PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE. — PRICES DO NOT INCLUDE HANDLING AND SHIPPING.

PERCOM DATA COMPANY, INC. 11220 Pagemill Road Dallas, Texas 75243 (214) 340-7081

™Trademark of Percom Data Company, Inc. *TRS-80 and TRSDOS are trademarks of Tandy Corporation which has no relationship to Percom Data Company. †Creative Computing Magazine, June, 1980, page 26.

can make significant changes in the presentation of the items. You can add up to 150 characters of description on each item. You can also group up to eight transactions. Only the sum of the detail will appear on the final statement. For the grouped transactions you can enter up to a 50-character description and the resulting group totals can be adjusted if required.

Once you have prepared the tentative statement, you can run a billing simulation. This program prepares a test invoice without adjusting the system totals. You can review the test invoice, circulate it among interested parties, and revise it if necessary. You can repeat this procedure as often as required. Once a statement has been approved, you can prepare the final statement and adjust the system totals to indicate that billing has occurred.

Although it is not stated in the manual, this billing procedure appears to have been designed for a practice where the billing partner and billing preparer are one and the same. If you delegate the billing procedure to another party, you may not realize the benefits of this method of interactive invoice preparation.

> *"Data entered during a session can be altered until posted."*

Entering transactions into the system has been designed to be as painless as possible. All transactions are entered during sessions. At the end of each session, a summary log is printed so that a permanent record is available. As you enter data, it is checked against the information entered in the reference files. Processing cannot proceed without a match. When the match has been made much of the information required for the transactions is extracted from the files and displayed. For example, entry of the case number automatically displays the client's name and the initials of the billing attorney or partner in charge of the engagement. Selection of a charge code defined as a time code automatically enables entry of time. When the time is entered, the value of the transaction is calculated based on the billing attorney's rates and charge code multiplier.

Unfortunately, if the work attorney is different than the billing attorney, the appropriate transaction lines must be changed with an edit procedure. You cannot override the system's automatic data insertion features. This is a small price to pay if there are few changes. Pre-coding much of the required transaction data speeds up data entry if editing can be kept to a minimum.

In this system data entered during a session can be altered until posted. However, once posted, changes require an offsetting amount. When posting occurs, the system prepares a transaction register and accounting summary. The accounting summary should be the source of posting to the books of account. Unfortunately, the only useful amount for a cash-basis taxpayer is the payments amount. There is no analysis of payments even though you may have used differing charge codes to separate payments of expenses from time. Transactions must be posted to be billed.

The reports contain an interesting statistic called the "cost" of the services rendered. To generate this information, code a cost figure into the employee file. This "cost" is then multiplied by the hours billed to develop the "cost" of the professional's time. This labor cost is added to the gross expenses billed and the markup percentage indicated on the system activity reports. This profitability information will only be of value if the professional's report costs approximates his actual cost to the firm. If you use this feature, reconcile the actual labor costs against the system costs on a regular basis. If you use a cost figure, make provision for time off and vacations.

Final Points

The Time Accounting System is not the only release of Model II software for the attorney. Tandy supplies a Westlaw communications package and a Litigation Support package (Cat. #26-4545). The latter is a Profile derivative with captions and reports designed to serve as an automated filing system for attorneys. Litigation support is an interesting application and, if a Model II is already on hand, could prove quite useful. A word of caution however—the danger of a micro such as the Model II is that there are too many applications where it can be useful.

The Model II is a *single*-user computer. It is also slow. If you use a single computer for time billing, litigation support, Westlaw and word processing, something will suffer. Prospective purchasers must scale down their hopes when installing this computer. It *cannot* do everything. Purchasers often hope to link applications together to improve work efficiency. This is rarely possible. Some are designed to work together (such as litigation support and the word processor), but Time Accounting and Westlaw are stand-alone systems.

It was inevitable that the matching of lawyers and microcomputers should spawn computer newsletters. The R.P.W. Publishing Corp., P.O. Box 1046, Lexington, SC 29072 has announced publication of "The Lawyer's Microcomputer." Their first issue covers such matters as what to buy, how to use, how to pay for your computer and other articles of interest. Subscriptions for the monthly newsletter cost $28 per year.

Attorneys are not the only targets of specialized newsletters. I know of at least one accounting organization that is planning a newsletter for its subscribers, and there are already several for physicians. These newsletters are valuable because they are written from the viewpoint of the user. If you have any experiences to share or good software packages which you recommend please do not hesitate to drop me a line. I receive letters addressed to the *80 Micro* offices, but they reach me more quickly if they are addressed to: Michael Tennenbaum CPA, 42 Bulaire Road, East Rockaway, NY 11518 ■.

EPSON MX-80
COMPLETE
PRINTER PACKAGE
SAVE $275.00
• EPSON MX-80
• GRAFTRAX-80
• EXTRA MX-80 RIBBON
• 500 MAILING LABELS
• 3200/2600 SHEETS (1 CASE)
TRACTOR FEED PAPER
• LISTER/CMI
• LETTERHEAD FEEDER
APPROXIMATE VALUE $844
You Pay Only $569
Rainbow
800-257-6170
in New Jersey 609-428-3900

Enclosed is my check for $569.85*
plus $11.90 for shipping and handling
MX-80 Complete Printer Package
☐ Visa ☐ Master Card ☐ Check
☐ C.O.D. ☐ Wire Transfer (less 2%)
Credit Card No._____Exp. Date_____
Name _____
Address _____
City _____State_____Zip_____
Phone ( )_____
*New Jersey Residents add 5% Sales Tax

Circle 250 on Reader Service card. →

Scanned by Ira Goldklang - www.trs-80.com

PENETRATOR

PENETRATOR — the fastest and most exciting game ever developed for the TRS80*

PENETRATOR features amazingly fast firing action accurate bomb release, incredibly smooth graphics and arcade type sound that you have never before seen or heard on a TRS80!

The console above shows the actual view from your TRS80. The four stages present continually new challenges and increasing enemy defense means each stage is more difficult than the previous one!

To aid you in this game we have provided you with a Training Simulation Mission which allows you to test your skills in any of the stages.

PENETRATOR is a game that will challenge you time after time, hour after hour. The unique customizing feature allows you to change the conditions of the game at will. This means that each PENETRATOR package actually contains hundreds of different games to keep you challenged and stimulated.

Don't wait any longer - PENETRATOR is available from your favorite software dealer or directly from the publishers.

PENETRATOR includes a 16 page booklet and is compatible with the Alpha joystick.
Available as:
- 16K TRS Model I/III, two cassette pack $24.95
- 32K TRS Model I/III protected diskette $24.95

Please add $1.50 per order for shipping
foreign orders add $6.00
California residents please add 6% sales tax
Write to us now with your order
Visa, Mastercharge accepted
Dealer enquiries Welcomed

Melbourne House Software Inc.
6917 Valjean Avenue,
Van Nuys, CA 91406

*TRS is a trademark of the Tandy Corporation

SOFT BITS
a basic/assembly column

by Roger Fuller

This month let's consider sorting strings in memory. One problem in any sort is exchanges—by reducing their number you can decrease sort time. For this reason non-bubble sorts work faster than bubble sorts.

Sorting Blues

However, all sorts require string exchanges at some point. In Level II Basic, string space is allocated dynamically—space is used as needed, instead of reserved and then used. More strings can be packed into a given area this way if the strings have different lengths.

Whenever a string in string space is assigned to a string variable, the string is duplicated in string space. This sometimes leaves holes in the string storage area.

These holes (or abandoned strings) are the reason for the infamous garbage collection routine. This Basic routine adjusts the strings in string space until no holes exist. Garbage collection time increases exponentially as the number of strings increases. (For example, it takes 100 times as long to adjust 10 times as many strings.)

A partial solution is to swap the string descriptors of the variables instead of the strings themselves. This takes longer than reassigning the strings but makes up for it by bypassing the garbage collection routine. This may mean a very considerable savings in large arrays.

Swapping the string pointers has a drawback—you must add offsets to the VARPTR addresses to get the least and most significant bytes of the actual strings. If the program runs in a 32K machine an overflow error results when the original VARPTR address is 32766 or 32767. I avoided the error in a program I purchased by adding an extra space to make the VARPTR addresses of the strings not span the 32K boundary.

Another Solution

A machine-language swap avoids the boundary problem and increases the speed of the swap (see the Listing).

This routine packs a string (U$) with code. Note the counter which determines the exact amount of space needed. An error trap in line 190 avoids a crash if you enter the date statements (lines 1000–1003) incorrectly.

Line 200 sets up the USR call and line 240 demonstrates the results. (I used subscripted variables to show you how easy they are.) Only line 230 is needed to accomplish the swap. Leave the rest of the code outside your loops.

The variable V$ is the key to this routine's ease of use. V$ must contain both variable names. Leading spaces are unimportant, but at least one byte must be free after the first name. I used a comma to accomplish this.

I transfer the address of V$ to the USR routine in line 230. The first instruction is:

```
CALL 0A7FH
```

This places the descriptor address in the HL register.

The next set of instructions is:

```
INC   HL
LD    E,(HL)
INC   HL
LD    D,(HL)
EX    DE,HL
```

This moves past the length byte of V$, and loads the least significant byte into the E register and the most significant byte into the D register. Then a register pair exchange leaves HL pointing to the first character in V$. A call to ROM (CALL 260DH) loads the DE register pair with the address of the variable. HL is left pointing to the first character after the name, a comma. The variable's data type will be in 40AFH.

The following instructions are needed to save this pointer on the stack and move past the comma. Since HL is now pointing to the second variable's name another call to ROM gets the pointer to the second variable's descriptor address. The address of the first descriptor is recovered from the stack (put there to protect it). Notice it was transferred from DE to HL in the process:

```
PUSH  DE
INC   HL
CALL  260DH
POP   HL
```

The final task is to swap the descriptors. Each descriptor is three bytes long so I set up a DJNZ loop to handle the iterations. The swap takes five steps (Fig. 1) instead of the usual three in Basic. Step 1 loads the A$(L) byte into C. Step 2 loads the A$(R) into A. (These are loads from

```
100 '  SWAP STRING USR ROUTINE   BY ROGER FULLER  PUBLIC DOMAIN
110 '
120 U$="12345678901234567890123456789012"' 32 BYTES FOR PACKING
130 U%=VARPTR(U$)                          ' U%=DESCRIPTOR ADDRESS
140 U%=PEEK(U%+1)+256*PEEK(U%+2)           ' U%=STRING ADDRESS
150 FOR L%=0 TO 31
160     READ BYTE : CKSUN = CKSUN + BYTE
170     POKE U% + L% , BYTE
180 NEXT
190 IF CKSUN <> 3063 THEN PRINT "CHECK SUN ERROR" : END
200 IF PEEK(16396)=195 THEN DEFUSR1=U%
      ELSE POKE 16526 , U% AND 255 : POKE 16527 , U%/256
210 V$="A$(L),A$(R)":L=0:R=1
220 A$(L)="LEFT" : A$(R)="RIGHT"
230 U%=USR1(VARPTR(V$))
240 PRINTA$(L),A$(R)
250 GOTO 230
1000 DATA 205,127, 10, 35, 94, 35, 86,235,205, 13
1001 DATA  30,213, 35,205, 13, 30,225,  6,  3, 78
1002 DATA  26,119,121, 10, 19, 35, 16,247,195,157
1003 DATA  10,251
```

Program Listing

SOFT BITS

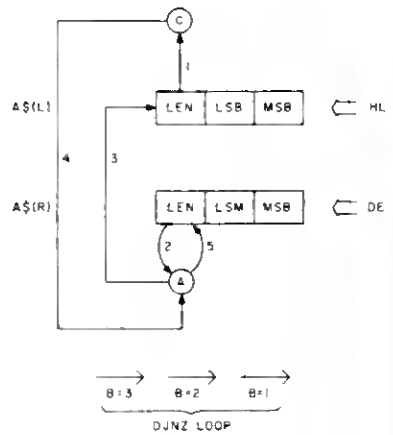


Figure 1

memory. The parentheses mean "outside the Z80.")

Step 3 puts the A$(R) byte into A$(L)'s descriptor. Since there is no LD (DE),C the A$(L)'s byte in C must be transferred to A before loading into A$(R)'s descriptor. The pointers DE and HL move up and the process repeats until B equals zero. The code for that is:

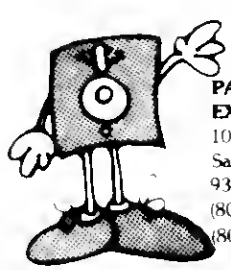
```
LD    B,3
LD    C,(HL)
LD    A,(HL)
LD    (HL),C
LD    A,C
LD    (DE),A
INC   DE
INC   HL
DJNZ  $-7
```

Finally, JP 0A9DH resets the data type flag to integer and returns execution to Basic.■

MEMOREX
FLEXIBLE DISCS

WE WILL NOT BE UNDERSOLD!! Call Free **(800)235-4137** for prices and information. Dealer inquiries invited and C.O.D.'s accepted.

VISA



PACIFIC EXCHANGES
100 Foothill Blvd.
San Luis Obispo, CA
93401. In Cal. call
(800)592-5935 or
(805)543-1037

↙207

FREE with purchase — Ads C/P/M Hyperion & ✕

FREE WITH EVERY WORDSTAR — MICROPRO WORDSTAR TRAINING GUIDE

DISCOUNT SOFTWARE
Ad#27

ULTIMATE SOFTWARE PLAN

We'll match any advertised price on any item that we carry. And if you find a lower price on what you bought within 30 days of buying it, just show us the ad and we'll refund the difference.
It's that simple.

Combine our price protection with the availability of full professional support and our automatic update service and you have the Ultimate Software Plan.
It's a convenient, uncomplicated, logical way to get your software.

✓ (New items or new prices)

CP/M® — DISK WITH MANUAL / MANUAL ONLY

CP/M users specify disk systems and formats. Most formats available.

ARTIFICIAL INTELLIGENCE*
Medical/PAS-3 $849/$40
Dental (PAS-3) $849/$40

ASYST DESIGN*/FRONTIER
Prof. Time Accounting $549/$40
General Subroutine $269/$40
Application Utilities $439/$40

COMPUTER PATHWAYS*
Pearl (level 1) $ 99/$25
Pearl (level 2) $299/$40
Pearl (level 3) $549/$50

DIGITAL RESEARCH*
CP/M 2.2
NorthStar $149/$25
TRS-80 Model II (P+T) $159/$35
Micropolis $169/$25
PL/I-80 $459/$35
BT-80 $179/$30
Mac $ 85/$15
Sid $ 65/$15
Z-Sid $ 90/$15
Tex $ 90/$15
DeSpool $ 50/$10
CB-80 $459/$35
C Basic-2 $ 98/$20

FOX & GELLER
✓ Quickscreen $135/$na
✓ Quickcode $265/$na
✓ dutil $ 65/$na

GRAHAM-DORIAN*
General Ledger $729/$40
Acct Receivable $729/$40
Acct Payable $729/$40
Job Costing $729/$40
Payroll II $729/$40
Inventory II $729/$40
Payroll $493/$40
Inventory $493/$40
Cash Register $493/$40
Apartment Mgt $493/$40

MICRO-AP*
S-Basic $269/$25
Selector IV $295/$35
Selector V $495/$50

MICRO DATA BASE SYSTEMS*
HDBS $269/$35
MDBS $795/$40
DRS or QRS or RTL $269/$10
MDBS PKG $1295/$60

MICROPRO*
WordStar $319/$60
Customization Notes $429/$na
Mail-Merge $109/$25
WordStar/Mail-Merge $419/$85
DataStar $249/$60
WordMaster $119/$40
SuperSort I $199/$40
Spell Star $175/$40
CalcStar $259/$na

MICROSOFT*
Basic-80 $298
Basic Compiler $329
Fortran-80 $349
Cobol-80 $629
M-Sort $175
Macro-80 $144
Edit-80 $ 84
MuSimp/MuMath $224
MuLisp-80 $174
Multi Plan Call
Manager Series Call

ORGANIC SOFTWARE*
TextWriter III $111/$25
DateBook II $269/$25
Milestone $269/$30

OSBORNE*
General Ledger $ 59/$20
Acct Rec/Acct Pay $ 59/$20
Payroll w/Cost $ 59/$20
All 3 $129/$60
All 3 + CBASIC-2 $199/$75
Enhanced Osborne $269/$60

PEACHTREE*
General Ledger $399/$40
Acct Receivable $399/$40
Acct Payable $399/$40
Payroll $399/$40
Inventory $399/$40
Surveyor $399/$40
Property Mgt $799/$40
CPA Client Write-up $799/$40
P5 Version Add $129
MagiCalc $269/$25
✓ Peach Pak Series 4 $1195/$na
Other less 10%

STAR COMPUTER SYSTEMS
G/L, A/R, A/P, Pay $ 359
All 4 $1129
Legal Time & Billing $ 849
Property Mngmt $ 849

STRUCTURED SYSTEMS*
Business Packages.
Call for Price

SORCIM*
SuperCalc $269/$na
Trans 86 $115
Act $157

SUPERSOFT*
✓ Ada $224/$na
Diagnostic I $ 49/$20
Diagnostic II $ 84/$20
Disk Doctor $ 84/$20
Forth (8080 or Z80) $149/$30
Fortran $219/$30
Fortran w/Ratfor $289/$35
C Compiler $174/$20
Star Edit $189/$30
✓ Scratch pad $174/$15
✓ Statsgraph $174/$15
✓ Dataview $174/$20
Other less 10%

SYSTEMS PLUS
✓ 1 Module $425/$na
✓ 4 Modules $1395/$na
✓ All 8 $3400/$na

TCS*
GL or AR or AP or Pay $ 79/$25
All 4 $269/$99
Compiled each $ 99/$25
Inventory $ 99/$25

UNICORN*
Mince $149/$25
Scribble $149/$25
Both $249/$50

WHITESMITHS*
C Compiler $600/$30
Pascal (incl. C) $850/$45

"PASCAL"
Pascal/MT+ Pkg $429/$30
Compiler $315
Sp. Prog $175
Pascal/Z $349/$30
Pascal/UCSD 4.0 $670/$50
Pascal/M $355/$20

"DATA BASE"
FMS-80 $649/$45
dBASE II $595/$50
Conoor II $899/$50

"WORD PROCESSING"
WordSearch $179/$50
SpellGuard $229/$25
VTS/80 $259/$65
Magic Wand $289/$45
Magic Spell $269/$25
Spell Binder $349/$45
Select $495/$na
The Word $ 65/$na
✓ The Word Plus $145/$na
✓ Palantier-I (WP) $385/$na

"COMMUNICATIONS"
✓ Ascom $149/$na
✓ BSTAM $149/$na
✓ BSTMS $149/$na
✓ Crosstalk $139/$na
✓ Move-it $ 89/$na

"OTHER GOODIES"
Micro Plan $419/$na
Plan 80 $269/$30
Target $189/$30
Tiny "C" $ 89/$50
Tiny C Compiler $229/$50
Nevada Cobol $179/$25
MicroStat $224/$25
Vedit $130/$15
MiniModel $449/$50
StatPak $449/$40
Micro B+ $229/$20
Raid $224/$35
String/80 $ 84/$20
String/80 (source) $279/$na
ISIS CP/M Utility $199/$50
Lynx $199/$20
Supervyz $ 95/$na
CP/M Power $ 75/$na
Mathe Magic $ 95/$na
✓ CIS COBOL $765/$na
✓ ZIP $129/$12

APPLE II®

INFO UNLIMITED*
EasyWriter (Prof.) $159
Datadex $129
EasyMailer (Prof.) $129
Other less 15%

MICROSOFT*
Softcard (Z-80 CP/M) $298
Fortran $179
Cobol $499
Tasc $139

MICROPRO*
Wordstar $269
MailMerge $ 99
Wordstar/MailMerge $349
SuperSort I $159
Spellstar $129

PERSONAL SOFTWARE/ VISICORP*
Visicalc 3.3 $199
Desktop/Plan II $199
Visiterm $ 90
Visidex $199
Visiplot $180
Visitrend/Visiplot $259
Visifile $169
✓ Visischedule $259

PEACHTREE*
G/L, A/R, A/P, Pay or Inventory (each) $224/$40
✓ Peach Pack $795
✓ Systems Plus, Accounting Plus II, G/L, AR, AP or Inventory (each) $385/$na (Needs G/L to run)

"OTHER GOODIES"
Micro Courier $219
Super-Text II $127
Data Factory $134
DB Master $184

16-BIT SOFTWARE

8086 SOFTWARE
✓ Supercalc $269
✓ Wordstar (ISMPC) $289/$na
Call for others

CALL TOLL FREE VISA • MASTERCHARGE
U.S. 1-800-421-4003 • CALIF. 1-800-252-4092 • LOS ANGELES 1-213-837-5141

Outside Continental U.S. — add $10 plus Air Parcel Post • Add $3.50 postage and handling per each item • California residents add 6% sales tax • Allow 2 weeks on checks. C.O.D. $3.00 extra • Prices subject to change without notice. All items subject to availability • ® — Mfgs. Trademark. Blue Label $3.00 additional per item

THE DISCOUNT SOFTWARE GROUP
6520 Selma Ave. Suite 309 • Los Angeles, Ca. 90028 • (213) 837-5141
Int'l TELEX 499-0446 DISCSOFT LSA • USA TELEX 194-634 (Attn: 499-0446)
TWX 910-321-3597 (Attn: 499-0446)

↙101

↙See List of Advertisers on page 338

80 REVIEWS

"Let's face it folks, zapping aliens on your $2,000 micro isn't far removed from shoving a Tonka dumpster up and down the driveway."

Armored Patrol
Adventure International
P.O. Box 3435
Longwood, FL 32750
Models I & III
$19.95 tape
$24.95 disk

by Silas Pike

I've yet to distinguish any real difference between arcade-type programs and any other basic children's game. Let's face it folks, zapping aliens on your $2,000 micro isn't far removed from shoving a Tonka dumpster up and down the driveway. Perhaps we rationalize our entertainment through sheer cash expenditure. The corporate executive who wishes to unwind at the end of a work day would hardly want to be seen by the neighbors battling imaginary alien forces on his front lawn—an expensive microcomputer is so much more, well, respectable.

However, it playing with little dump trucks were as much fun as Wayne Westmoreland's and Terry Gilman's Armored Patrol; I might be tempted to head for the front yard myself. Armored Patrol's command-chair perspective of the action is unique.

Your mission is to destroy enemy tanks.

In this age of interplanetary wars, hyperspace (ya gotta have hyperspace), and Carl Sagan, tank versus tank in a battle to the death seems almost too tame. What separates this from the ordinary and World War II-type games are plasma bursts instead of conventional shells, robots in lieu of human troops, and missions taking place on an alien landscape.

During the game the screen of your micro becomes your tank viewscreen. Through it, you look out upon a flat, desert-like area peppered with blockhouses. In the distance, mountains loom stoically, marking the zone limits. You move your tank forward or backward, left or right by using four keys (A , Z /). The space bar fires your plasma bursts.

The idea is to maneuver your tank throughout the area in search of enemy tanks and robots. Some of the tanks are out in the open; a goodly number of them are hiding behind the blockhouses where they are least conspicuous and vulnerable. Frequently, an energy-zapping robot rolls into position brandishing twin ray guns. When you are hit, it depletes your energy reserves by one unit (you begin with 20). Once your energy level falls to zero, you lose one of your tanks. (You have four tanks per game. An extra tank is awarded at 20,000 points.)

What impressed me the most about Armored Patrol is the amount of action going on off screen. The battle area is finite—your viewing area is limited to one narrow area—but throughout the entire battlefield, tanks are lumbering to and fro between blockhouses and across the open desert. Robots pop up now and then, dispensing their own deadly form of havoc. All of this creates a you-are-there feel to the game.

If the degree of action is Armored Patrol's best feature, then the 3-D-style graphics are a close second. By using the left/right controls, you are able to do a 360-degree sweep of the entire area. As your tank moves forward or backward, enemy tanks, blockhouses and robots dimensionally swing into and out of view. Distant objects appear first as specks on the horizon and gradually grow in size as you move toward them.

After selecting the number of players (one or two), your viewscreen activates and you are looking out across a bleak, level panorama. Your instrumentation consists of a graphic depiction of the number of tanks you have remaining in the game, your energy level, and an enemy radar made up of four arrows arranged in compass fashion. If an enemy tank is in the immediate vicinity, one of the arrows flashes on and off; you will need to maneuver your tank in the direction indicated to confront it. If the radar is clear, select a direction and go until you spot something on your viewscreen. Hopefully, you will find a tank positioned with its barrel aiming away from you. If this is the case, a well-aimed shot on your part is in order. If not (and the enemy's preparing to fire), you will have to make a quick decision whether to fire (hoping you get him first), or maneuver into a safer location. The trickiest part is dealing with a tank that fires just outside your periphery making a counter-maneuver impossible.

The wild cards in Armored Patrol are the energy-sapping robots. Frequently, these weapon-wielding mechanizations pop up with little or no warning whatsoever. They are particularly nasty when appearing with a tank, or if they materialize directly behind you. Since it takes about 10 seconds to rotate your tank 180 degrees, a robot may put a sizable drain on your energy supply before you can blast the little bugger.

The tanks fragment into pieces when destroyed, but a robot pulses on and off before it disappears into ionic oblivion. I haven't figured out if enemy tanks are actively aggressive towards the robots or if the robots just blunder into their line of fire. In any event, the robots can be destroyed by either side.

Armored Patrol's biggest failing is the sound routines. I think a tank battle should be accompanied by low, rumbling sounds—not the blips and whines evident here.

A second (and frequently irritating) problem is that one can be shot by an enemy tank within a split-second of the game's beginning. Some type of danger delay when the game initiates would be most welcome.

The final and most minor suggestion for improving the program would be making the blockhouse vulnerable to your fire. As it is, shooting a blockhouse with your plasma bursts has no effect. It would be nice if you could demolish one (over the course of several shots) with your plasma cannon and expose any tanks lurking behind.

Armored Patrol is a solid buy for the price. Its graphics are surprisingly realistic, and draw you into the game. It took me quite a few playings before I realized that there was a method to this interesting madness—strategy and thought are definitely in order to rack up a respectable score.

Armored Patrol is an enjoyable program and should be of interest to anyone who enjoys fine arcadia. ■

Basic Advantures
Bob Liddil
80-Northwest Publishing Inc.
3838 South Warner St.
Tacoma, WA 98409
Softcover, 252 pp.
$19.95

by **Michael E. Nadeau**
***80 Micro* staff**

Adventure games are a little like those Harlequin romance novels you see on the bookstands in the supermarkets; the plots and style change little from one game to the next, but once you are hooked you could find yourself playing them most of your waking hours. This may prove expensive for the adventure junkie who finds himself buying game after game, but Bob Liddil, a.k.a. Captain 80, has provided a fix that will keep those junkies on an adventure high for quite some time.

Basic Adventures is a collection of 18 adventure games by such well known authors as Scott Adams, Greg Hassett, Lance Micklus and Teri Li. The games are all available in software form, and include titles such as Dog Star Adventure, Atlantean Odyssey and Lost Dutchman's Gold.

These adventures are excellent representations of the genre, although not all are identical to the software versions. Atlantean Odyssey is written in Basic in the book, but the software version is in Assembly language. It appears virtually the same on the screen, but undoubtedly runs slower in Basic—a minor nuisance. Other adventures have been mildly refined; for instance many spelling errors appearing in the originals have been corrected.

For readers unfamiliar with adventure games, they require mental acumen rather than the digital dexterity needed for arcade-type games. (A Thesaurus also helps if you have trouble finding the correct command word.) The program sets a scenario and describes the situations you get yourself into. You must decide where to go, what to do, and how to do it. You could be a moonshiner running hootch; do you run the roadblock or turn around? How do you fix your souped-up '57 Chevy? How is it broken down? Can you avoid the "revenuers" long enough to make your delivery?

If moonshining doesn't enthuse you, there are space adventures, too. If that bores you, you could be a CIA agent on a deadly mission, or a prospector searching for a lost cache of gold, or a. . . The list goes on. There are just 18 choices in Liddil's book, enough for months of puzzle solving.

This book also gives advice on how to write and sell adventure games. An adventure generator program provides the bare bones for creating your own adventure; you just plug in the plot and its various twists and turns. Liddil gives hints on how to sell your creations and lists potential markets.

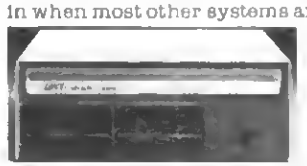
The veteran adventurer should be well aware of the quality of these games, some are industry standards, and the reputation of the authors. If these programs have proven themselves on the marketplace, why publish them in a book?

Liddil says he wants to expose more people to adventure games. He appears to have found a good way of doing just that. For the price of one software adventure, *Basic Adventures* provides 18 (of course, you have to do a lot of typing). Not only is this a financially painless introduction to adventure, but the listings are valuable as tutorials in how adventure programs work.

Basic Adventure is a good effort and should be of interest to anyone who plays adventure games or thinks they might want to.■

Is your floppy a flop?

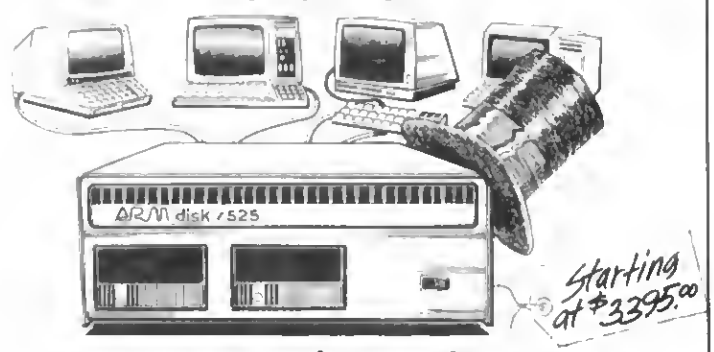
Book the new ARMdisk/525 Winchester subsystem with your personal or small business computer and enjoy a performance no floppy can equal. Hard disk capacity of up to 30 megabytes keeps you packin' them in when most other systems are playing to a full house.



And eight—count 'em—eight heads team up to cut data accessing time by as much as 80%.

Backstage, the ARMdisk/525 usee an intelligent controller to help ensure data integrity and an error correction code that's stored on-disk to make data loss practically impossible.

On the supporting bill are TRSDOS compatible operating systems to provide for media back-up as well as *intelligent* file eave-and-restore. With a MTBF of 8,000 hours and a multiplex feature that allows up to four hosts to share the same unit, the ARMdisk/525 has the kind of star quality that legends are made of.



You'll applaud the price/performance of the Winchester disk from ARM.

Clip this coupon and learn how you can add an ARMdisk/525 to your cast.

I own a: ☐ TRS-80 Model II
☐ Model III ☐ Apple II
☐ IBM PC ☐ NEC
☐ Other
Dealer inquiries invited

Name _____
Address _____
City State Zip

For further information, please contact
Automated Resource Management
3613 West MacArthur Boulevard
Santa Ana, California 92704
(714) 850-9792

↙543 PC-Au

↙See List of Advertisers on page 338

Maces & Magic
Adventure International & Chameleon Software
Box 3435
Longwood FL 32750
Models I & III
$29.95 each, disk

by **Mark E. Renne**

The Maces & Magic series consists of three adventures; Bairog, Stone of Sisyphus, and Morton's Fork. The difference between this series and other adventure-type games on the market is their cross with role-playing games. Your character is unique in structure and events occur differently depending on your own attributes.

The games may be played in any order or separately. You begin in the general store. Here you will roll up a character and arm him for future battles against evil. Individual attributes are strength, IQ, luck, constitution, dexterity and charisma. If you've played Dungeons & Dragons or Runequest, you'll recognize these characteristics; they have the same function here as they do in those games. Strength is one of the most important as it determines how much you can carry and what type of weapons you may buy. IQ is handy for catching things that another adventurer, one with a lower IQ, might miss (perhaps a secret door or two).

Another important attribute is constitution. The higher the number here the more abuse you can take in battle. A clumsy person will surely fall into any trap that happens by. Dexterity will save you from that fate. It also comes in handy for climbing mountains or swimming rivers. Charisma is important even in the dungeon. Many a savage witch has been cooled by shiny teeth and blue eyes. The computer will keep rolling characters until it's gray in the case. If you see one you like, simply say that you'll use the character and on you go to stage two of development.

Now comes the time to choose a weapon. There are 80 different weapons. Each has a name and power, weight, cost, dexterity and strength ratings. Weapons do different degrees of damage depending on their power. You wouldn't take a slingshot against a giant. To use a particular weapon you must be able to afford it, carry it, and swing it. Gold does not grow on trees. Sometimes you have to fight a while, buy new weapons, fight some more and so on. Trade-ins are accepted at reduced rates. Armor is then chosen in the same way. The best costs more, weighs more, and protects more. There are more than 25 types of armor. If you happen to have some gold left, you may leave it at the general store or take it with you. It's always good to have mad money (in case someone gets mad at you).

Commands are all one letter and include (G)et, (L)eave, (P)ack, (H)elp, (S)tatus, (W)ait, (I)nventory, and (*)save game. Get and leave are for picking up and leaving items you find along the way. If you pick something up, it will be placed in your pack. By pressing P you will receive a listing of your pack. You pick the item you want and the computer asks, "What do you want to do with the...?" You respond with a verb or a verb and noun. Help will give you a summary of the commands. Status indicates your *current* attributes. In this adventure you may lose attribute points either temporarily or permanently. Wait is a handy command for catching your breath or watching bees buzz. Inventory lists your current pack items, weapons and armor. I will discuss saving the game later.

Playing the game is much like playing most adventures with a few twists. You find objects and try to manipulate them correctly. The rooms or locations are loaded one at a time off disk. This means the computer constantly accesses the disk if you're moving along quickly. Your options are all listed on the screen. For example, you're in a room and a dwarf throws a slime worm at you. The screen will indicate: 1-East 2-West or 3-Fight Worm. You choose what you'd like to do; run away or fight like a man. Remember, the secret to this game is finding treasure and getting out alive! Events will vary greatly depending on your individual characteristics. The battle is shown as the participants receive hit points. You have the option of running away, changing weapons or continuing every few turns. If you defeat the creature, you will sometimes find he carried treasure. Other creatures in the dungeon provide services for payment—sometimes good, sometimes bad, sometimes optional, sometimes mandatory. Some events you only get one shot at (you see five boxes—pick one).

Saving a game is a time-consuming process. If your character is in an adventure, the game saves all the details and you may pick it up there later. If you get out of trouble, your character will be saved and he may go to a different adventure stronger, wiser and richer. A running total indicates survivors as a percentage of total adventurers. Also, a record is kept of the largest treasure taken out and most gold carried out with the player's name. A score is displayed with a rating to indicate your proficiency. Then you must reload the game to continue if you save your character at a tight spot and now want to continue.

The game is fun and a nice blend of adventure and chance. My only complaint is that it's written in Basic; it's very slow. The game seems unbearably slow when saving a game as you must traverse different programs to accomplish this. It comes with excellent documentation and loading instructions. If you have a Model III and are using TRSDOS 1.3, patch your DOS to allow killing one file while another is open. Aside from the speed, I would recommend these games, without reservation to role-playing computerists.■

Robot Attack
Big Five Software
P.O. Box 9078-185
Van Nuys, CA 91409
Model I or III
$15.95 cassette
$19.95 disk

by **Carl Kollar**

Robot Attack is a cassette-based arcade game for one or two players that puts an Earth warrior against several Jidyan robots.

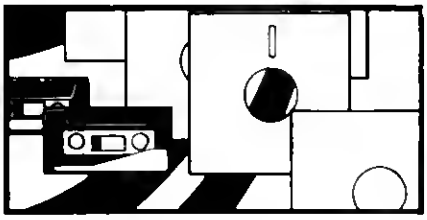
Your warrior roams the maze looking for robots. At first it seems too easy to destroy the robots without being shot at in return but suddenly the robots counter-attack and you're kept busy just trying to avoid their laser fire. A robot laser-blast can wipe out your warrior from anywhere on the screen as long as a clear path exists between your warrior and the attacking robot.

To keep you from becoming too familiar with the game layout, your warrior is in a different set of rooms (or maze) each time you play the game. You control your warrior's movement with the I,J,K and M or arrow keys; the F key or the space bar fire the lasers. Joysticks can be used instead of the keyboard. You cannot fire around corners.

Robot Attack comes with sound and speaks to you during the game, using such words as "player one," "player two," "chicken," "lucky," "game over," and "great score." Sometimes the words are used in sequence to form phrases like "great score player one"; the words are robot-sounding but understandable.

You're awarded an extra warrior after 5,000 points and another after 10,000 points.■

Laser Defense
Simon Smith
Med Systems Software
P.O. Box 3558
Chapel Hill, NC 27514
Model I or III
$14.95 cassette
$17.95 disk



by **Mark E. Renne**

I would order a product sight unseen from only a few companies and Med Systems is one. Laser Defense is their first attempt at an arcade-type game and they score big. This is not just another version of Missile Command; it's a totally original game.

Your mission is to keep missiles from destroying your cities while destroying Russian launching stations. This game is a combination of strategy and arcade fun. You begin with six cities and four hovering satellites while your computer enemy has 12 silos and an unlimited number of particle-beam weapons traveling on MX tracks. These weapons appear at intervals to fire at your satellites. Two views or maps are available to you: one of the United States and a Europe/Soviet Union map. Maps are switched by pressing 1. The U.S. map indicates cities and incoming ICBMs. To destroy a missile in flight, you position your sight with the arrow keys and fire with the space bar. If the nuclear blast is close enough, the incoming missile is destroyed and your city saved. When all the cities are destroyed, the game is over.

Your ultimate weapon against ICBMs is the eradicator. It is engaged by pressing E, and destroys any missiles in flight immediately. This is very handy in a pinch. The eradicator, however, also maintains your satellites' shields. If the eradicator energy, indicated at the bottom of the screen, falls too low, the satellites will be destroyed by the first blast of a particle beam weapon. Eradicator energy is only refilled at scoring intervals of 10,000.

Should you happen to survive the first wave of silos, you will be awerded a bonus of 200 points for remaining cities and 10 points for any remaining energy units. Laser energy is refilled and another wave begins. As you go through each wave, you face en enemy that becomes more difficult to defeat. Missiles are launched faster, in greater numbers and particle weapons appear more often. Scoring is as follows: missiles in flight get 10 points; missile silos get 100 points; particle beam weapons get 1000 points. Once in a while a nuclear power plant appears in East Germany. Should you destroy this target, you score 4000 points. All targets require extreme accuracy to destroy and the nuclear power plant requires your precious eradicator.

Fast reflexes, marvelous finger coordination, and a methodical plan of attack improve scores. Both maps feature full wrap-around, and mastering this aspect of the game makes a big difference in the latter stages. For example, a missile is about to destroy Los Angeles and you have just saved New York City. If you went across the U.S., you would never make it. However, it's just a hop across the ocean.

Since missiles leave Russia and cross over the Arctic Circle you can time how long it takes before your cities get into trouble. By wiping out the silos in northern Russia first, you will add precious seconds to the time you have to destroy the missiles. As the game progresses, missiles are constantly flying and particle beam weapons appear as fast as bugs in "perfect" operating systems. The strategy at this stage is to destroy one silo, switch to the U.S., save cities, switch to Russia, destroy one silo, and so on. If you get greedy or slip up, either your cities or satellites will be destroyed.

Other features of this game include a convenient pause key, P, which allows you to freeze the game should you have something more important to do than save the world. This is a machine-language game for one or two players, and the top five scores are saved on the disk version. The disk version also features the Brandon loader which allows you to "boot" the game on either a Model I or III. Complete sound effects are featured, including an indication that a particle-beam weapon has appeared. Games may be aborted by using the break key as well as the revolving demo that appears when the game is not being played.

This game has 10 degrees of difficulty. At the highest, it shows just how fast machine language can be. The game is fun, works well, and presents a challenge even after several hundred plays. It's a super original arcade game designed for the TRS-80. Maybe Med Systems can sell it to Atari for arcades....Hmmm.■

NEW SYSTEM MAKES TRS-80 III A TOTAL CASH REGISTER & POINT-OF-SALE COMPUTER

Which performs all the normal functions of a computer and is specially programmed to

- **COMPUTE** Sales Taxes, Discounts, Special Sales and Promotions
- **TRACKS** Sales by Type, such as Visa, Mastercard, Check, Charge, etc. and by Employee/Operator for up to 30 people
- **SELF-PROMPTING** to Cashiers
- Produces Audit Trails and **ACCOUNTING DATA** for entire operation
- **CONTROLS** up to 20,000 **INVENTORY** LINE ITEMS on our Hard Disk Drive
- **CONTROLS** up to 1,500 **INVENTORY** LINE ITEMS on your Floppy Drive
- Complete, Ready-to-Run **SOFTWARE** comes with Cash Control Drawer Unit
- **AUDIBLE SIGNAL** produced when any key is depressed by any operator
- **DRAWER** operates automatically or by manual override anytime
- Generates **RECEIPTS** on Printer
- Available to display in English, French, Spanish, or German Languages
- Operates on 110AC or 220AC...just plug it in
- **NO INTERFERENCE** with or modification of regular TRS-80 Mod III ,plugs right into computer

FREE Specifications and Data Package or order complete Operating manual for $15 from

ICR/FutureSoft
Box 1448 · Orange Park, Florida 32073
(904) 269-1918 for technical assistance and Dealer Information

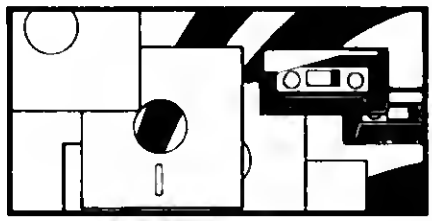
Integrated Cash Register Systems from as low as $449.

ICR-Futuresoft
Software of Tomorrow...Today ✓211

✓See List of Advertisers on page 338

Alcatraz II
Spectral Associates
Tacoma, Washington
Color Computer
Extended Basic, 16K
$11.95 cassette

by Rich Petty



Alcatraz II is a beautiful example of the improvements in the quality of the products for Color Computers today.

It is e prison escape game, where by using e combination of skill, strategy, and a lot of luck, you might get out. As they say in the introduction, no one has ever escaped from Alcatraz II. After having logged over 25 hours on the game I believe it! Alcatraz II features numerous wings (or cell blocks). Your score increases with each one you make it through. Each wing, starting with wing number 2, becomes progressively harder than the one before it. Wings 1, 2, 3 and 5 are identical (except for the number of guerds). They consist of five east-west hallways and five north-south hallways. (See Fig. 1.) The three locked gates between you and your exit point from the wing ere your least serious problem; more serious are the laser cannons. They seem to fire down all north-south halls or all east-west halls at random intervals. You are warned by a 5 to 10-second audio alarm before they slowly protrude from the walls to take aim. If you watch, you have three to four seconds to determine the direction of their fire. This usually gives you time to change halls. The real rub is, the laser cannon firing mechanism automatically relocks all of the gates that had been unlocked. That can leave you in an impossible situation.

How do you get the gates unlocked? The guards will do it for you. They constantly wander down the halls opening gates as they go. When they come to an intersection they make a random decision as to which way to go. If they find themselves in the same hall you are in, they will pursue you, opening (and leaving open) any gates in their way. If they catch you the game is over. However, you can outrun end hide from them. Since their direction is unpredictable (when they can't see you) you are caught more times by accident than by design. The guards ere not too smart, but they outnumber you. The fourth wing has no guards. It is a man-eating minotaur's den. A minotaur is bigger and faster than you are. Its lair has walls and force fields which only minotaurs can go through. When a minotaur crashes through a wall he destroys it, providing a path you can use later.

Keep in mind that there are switch boxes in each minotaur's lair. If you can get to a switch box, where you are safe from the minotaur, you can turn off the force field that switch box controls. I've been in a minotaur's lair three times. I got out twice. I've heard rumors that there are several minotaur's lairs and also that robots are used in some of the final wings. (I haven't been there to confirm that.)

I can confirm that this is one game you won't master in two or three hours. It is a very challenging, well written game that won't cost you an arm and a leg. The game is a combination of medium and high-resolution graphics (Your character is a small block containing a stick figure es are the guards and minotaurs). You move your character with either the arrow keys or joysticks. The color is great and the sound effects are super!

There are some irritating points you should be aware of. The tape comes with an instruction program which later loads the game program. I picked up an I/O error on my first attempt to load the game and had to load one of the three back-up copies. It was an irritation, but I was grateful the company sent more than one copy of the program.

There is a bug that may or may not affect you, but you should be aware of it. If the program loads, then errors after typing run, type run again and it will probably be fine. If it errors again, turn off and back on your computer, type PCLEAR 2, reload the program, type run and it should go. This bug is not in the program but in Radio Shack's Extended Basic ROM version 1.0. Radio Shack writes of it briefly in the February, 1982 *TRS-80 Microcomputer News*. What they didn't say is that the bug can crash a program.

Another thing, when you make it through a wing, you are given a score which from game to game varies. I haven't been able to tell why it varies, or how to get the top score. It's no big deal. I just can't figure out why my wife gets 600 points for going through the first wing and I get only 450.

I *highly* recommend the game, and for the price it's a steal! ■

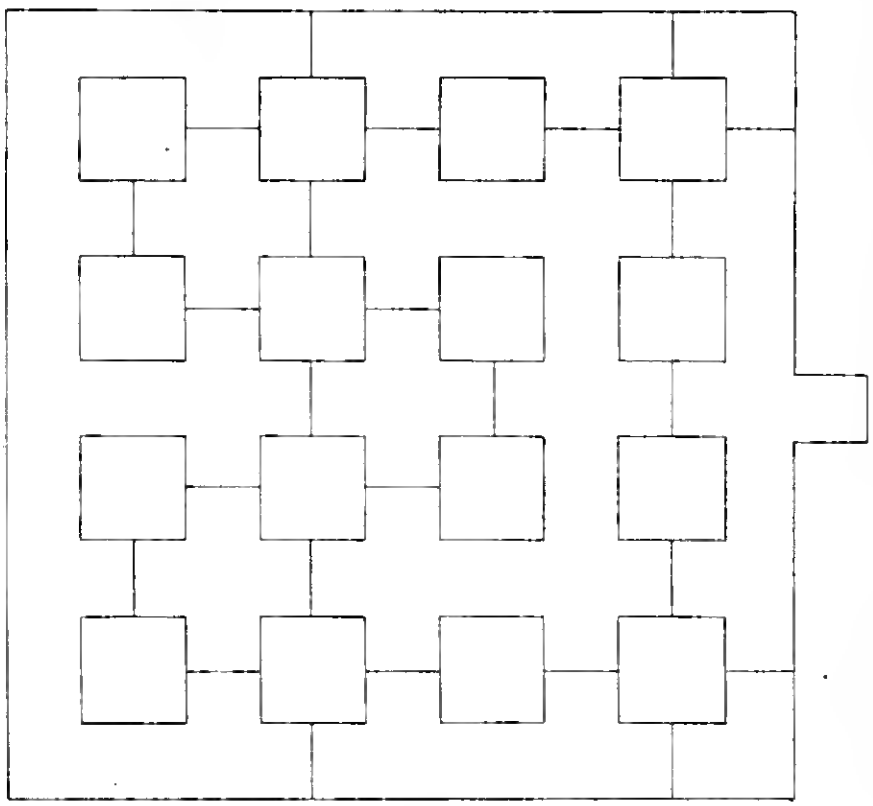


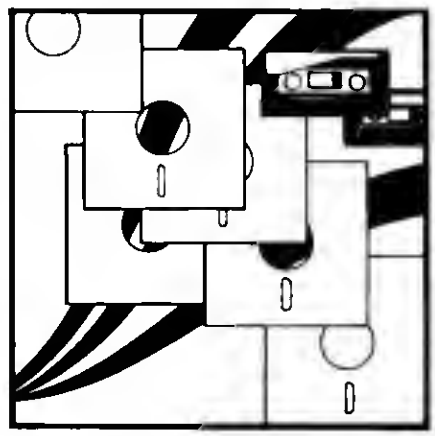
Figure 1

Scanned by Ira Goldklang - www.trs-80.com

Forbiddan City
William Damaa
Fantastic Software
P.O. Box 27734
Laa Vegaa, NV 89126
48K Modal I or III
$39.95 diak
by **Mark E. Renne**

"Arrgh, I'm dead!" my faithful amplifier spits at me in spite. "Play again?" asks another voice. I scream NO and hope this time the robots don't bump me off so quickly. That's right, Forbidden City is a talking adventure system. Not only does it have sound effects, but the game has three separate voices with gender and emotion.

Forbidden City is the second talking adventure from William Demas, coauthor of Scott Adams' Adventure #12. The first was Forbidden Planet. Although the story line is connected, you don't need one to play the other. The adventure is in machine language on a self-booting disk and requires 48K. Standard verb/noun commands are accepted and the split screen is used for display. The game has a vocabulary of over 140 words for input and a separate vocabulary for spoken words. Game saving is easy and up to 10 games may be saved at one time with comments for each. The game comes in a very convenient folding disk case with a hint sheet.



What sets this game apart from most adventure games is the voice. The voice is *not* meant to help or guide you through the adventure. It does, however, dispense critical information at times. The game may also be played with the voice off without missing any clues.

In Forbidden City there are three separate voices. One is a female voice of the city computer, she has an alluring voice and is usually looking for information such as passwords. The voice of your computer is pleasant and similar to the only voice in Forbidden Planet. This voice excitedly says "I found something" if an exam item is fruitful and "OK." It also sounds a little sick after radiation poisoning, you know death is certain without treatment. The last voice belongs to the robots guarding the city. Once you're spotted by guards they chase you shouting "Stop Alien" or "Stop Intruder." It's only a matter of a few turns before they kill you. I have not figured out how to deactivate them yet.

The adventure's style is similar to most of Adams' adventures. The robots make the game challenging and difficult. The three voices are a definite plus; their words are very clear and their emotions are convincing. Adventures may never be the same.■

PRICES LOWERED AGAIN! (THOSE WITH $ SIGN) **RIBBON SALE** EXACT REPLACEMENTS, LONG-LIFE, HEAVY INKING

Good This Month RADIO SHACK-CENTRONICS-EPSON-ANADEX-BASE 2-HEWLETT PACKARD-MALIBU-IBM PRINTERS

PRINTER MAKE, MODEL NUMBER (Contact us if your printer is not listed. We can probably RELOAD your old cartridges.)	RIBBON SIZE Inches by Yards	INSERTS EZ-LOAD™ EXACT REPLACEMENTS made in our own shop feature LONG-LIFE and HEAVY INKING. Our instructions: DROP IN, NO WINDING! $/# (Cartridges NOT re-loads)		RELOADS You SEND your used CARTRIDGES to us. We RELOAD them for you. $/#		NEW CARTRIDGES (from the various manufacturers. Subject to availability.*) $/#			SILVER DOLLAR WIND to LOAD
ANADEX 9000 Series	1/2x30	21/3	78/12	10/1	$8/2 or more	*	*		WHY DO WE SELL THESE? This is the type ribbon you get if you order from our fellow advertisers. We sell them for less since we make them ourselves. Do you really like the mess and inconvenience of unwinding and dumping this type ribbon into a waste-basket or out on a newspaper and/or winding it into your cartridge? We don't know why these are being sold. Computers should simplify your life, not make it more complex just to save a few pennies. You are welcome to order these if you cannot afford our EZ-LOAD® INSERTS, RELOADS, or NEW CARTRIDGES. But BEWARE! You now know how to avoid disappointment. One more caution: be sure to check the length of any ribbon BEFORE you buy it. For instance, an MX-100 ribbon should be 30 yards long, not 26 as in the MX-80.
BASE 2	1/2x20	19/3	66/12	9/1	$8/2 or more	$30/2	$87/6	$168/12	
CENTRONICS 7-MEG 702/703/704/753	5/16 x 10	.....		11/1	10/2 or more	$25/2	$72/6	$140/12	
HP-MALIBU 2608-2631	3/4x60	.....		20/1	$18/2 or more	*	*		
RADIO SHACK DAISY WHEEL II Carbon Film (26-1419)	1/4 x 185	$25/6	$48/12	$270/72	15/3 or more	$18/3	$70/12	$408/72	
COLORS Red, Green Blue, Brown	1/4 x 130	$30/6	$58/12	$324/72	18/3 or more	$21/3	$82/12	$480/72	
Long-Life Fabric (1449)	1/4x25	$24/3	$47/6	$90/12	9/1 $8/2 or more	$20/2	$58/6	$112/12	
LP I-II-IV 700 Zip-Pack (1413) 730/737/739/779	5/16 x 18	13/3		48/12	.....	.....			12/3 44/12 252/72
LP III-V (26-1414)	1/2x18	$18/3		$66/12	9/1 $8/2 or more	25/2	75/6	150/12	
LP VI-VIII (26-1415)	5/16 x 18	$17/3		$62/12	9/1 $8/2 or more	22/2	66/6	132/12	11/3 40/12 226/72
LP VII (26-1424)	INKER LOOP	.....			.....	16/2	48/8	88/12	.....
EPSON MX 70-80 IBM	1/2x20	$16/3		$60/12	9/1 $8/2 or more	$21/2	$60/6	$108/12	12/3 44/12 252/72
MX 100	1/2x30	$21/3		$76/12	11/1 10/2 or more	*	36/2	*	16/3 66/12 360/72

SEND CHECK, MONEY ORDER, or COD ($2.00 UPS) TO:

BCCOMPCO ✓152

800 SOUTH 17 BOX 246
SUMMERSVILLE MO 65571
417 932-4196

WE PAY SHIPPING ON PREPAID ORDERS. PLEASE INCLUDE STREET ADDRESS FOR UPS DELIVERY. NON UPS, MEXICO, CANADA, ALASKA, HAWAII, ADD $1.00. FOREIGN ADD 10%, US FUNDS ONLY. NET 30 ACCOUNTS AVAILABLE. CALL.

WORRIED ABOUT ORDERING BY MAIL? Relax. We've been in business for many years and can please the smallest and largest account. You receive some of the finest ribbons available made of our own exclusive IMAGE PLUS-™ fabric and carbon film. Our ribbons fit your printer exactly. (COMPARE, but BEWARE! We order all our competitor's products and are amazed at what we get. Have you ever received a new fabric ribbon you had to unwind and dump out on the table before you could use it? We have. Or, carbon film inserts that had no end-of-ribbon sensor? Or, 7-meg cartridges with only HALF enough ribbon at full retail? Our only business is RIBBON manufacturing and distribution. We use the latest state-of-the-art production equipment and are blessed with a fine, dedicated staff. We fully guarantee all our products because we make them ourselves. You must be completely satisfied, period. Our ribbons are made fresh daily and shipped within 24 hours. Write for our brochure and newsletter "INK SPOTS". Dealers welcome. Bob Cave President

Volume 1 **MODEL II 8" GAME DISCS** Volume 2

Biorhythms, Trap
Rip Cord, Yacht Sea
Concentration & 4 More

$25.00 each

Ugly, Bingo
Towers, Blackjack
Farkle, Pony & 3 More

KUDOS: (Unsolicited comments from some of our users.)

"Thanks again for your excellent product and service."
"EZ-LOAD is terrific! I'll never wind a 'silver dollar' again."
"You people do good work. Thank you." "The previous order was very good."
"We received your ribbons the next day. We couldn't believe it!" (We couldn't either.)
"The inking on our last order (LP V INSERTS) was much better than 'store-bought' ** cartridges."
"I have appreciated the quality, service/turn around on orders, and clear instructions of your products."
"We just went through three of your (DW II) reloads, and there's no question they are better than the originals!"

USERS: Doctors, lawyers, accountants, hospitals, schools, universities, U.S. Armed Forces, small and large corporations, state and federal agencies, Radio Shack Dealers, and a lot of just plain 'folks'. Need a recommendation in your area? Call us. We have users all over the world, in Japan, Australia, the Philippines, Italy, Canada, Mexico, Sweden, England, Columbia, Kenya and many other countries.

✓See List of Advertisers on page 338

MODEL II USERS: Access DEC with REFORMATTER™

ReformaTTer conversion software lets you *read* and *write* DEC RT-11 single density diskettes on your Model II under TRSDOS or CP/M.

ReformaTTer is ideal if you want:

- Access to large system data bases
- Distributed data processing
- Offline program development
- Database conversion

With ReformaTTer, you have:

- Automatic file conversion between Model II and DEC RT-11 single density diskettes.
- Complete DEC file reorganization and maintenance facilities.
- Access to RSTS/E, RSX11-M and VAX/VMS via DEC resident utilities reading RT-11.

Customers like Memorex, Upjohn, Arthur Young & Co., the U.N., Stanford U., and Sandia Labs enjoy the benefits of ReformaTTer. So can you. Specify the version of ReformaTTer for your operating system:

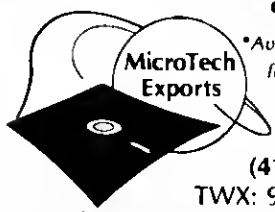
TRSDOS ↔ DEC
CP/M ↔ DEC

TRSDOS version runs on one drive. CP/M version requires two.

Other Model II versions of ReformaTTer conversion software include:

TRSDOS ↔ CP/M
TRSDOS ↔ IBM*
CP/M ↔ IBM

Order ReformaTTer today at $249 each version.



*Available exclusively from Radio Shack, Cat. #26-4714.

✓ 380

(415) 324-9114
TWX: 910-370-7457
467 Hamilton Ave., Suite 2, Palo Alto, CA 94301

Please send complete information on the following versions of ReformaTTer_____

Please send ReformaTTer ☐ TRSDOS↔DEC ☐ CP/M↔DEC.
My check for $249 (plus $5 shipping. Cal res. add 6½% sales tax).
☐ Charge to my ☐ Visa ☐ MasterCard.
#_____ exp. date_____
Signature_____
Name_____
Company_____
Street_____
City_____
State_____ Zip_____

Mail to MicroTech Exports, Inc.
467 Hamilton Ave., Palo Alto, CA 94301

80 REVIEWS

Starbuck 8882
Starbuck Data Company
P.O. Box 24
Newton Lower Falls, MA 02162
Completa System:
$180 Model I
$199 Model III

by Jake Commander

The Starbuck 8882 is a data acquisition and control system for the Model I or III. The purpose of this black box unit is to relay data between the real world and the TRS-80. The TRS-80 can receive analog or digital data and can respond by setting bits in an output port in the 8882. Normally, the only input the TRS-80 ever sees is from character-oriented I/O such as the keyboard, cassette and possibly disk units. The Starbuck allows data to be collected in two main ways: A continuously varying analog voltage can be sampled from any one of eight input lines, and eight lines may be polled to detect open or closed switches connected to the unit.

The documentation has all the information you are ever likely to need. It is 75 pages in length and although the print quality is of only medium quality, its contents should serve as a model to any manufacturer of peripheral hardware for the TRS-80.

Everything is covered from a description of installation and operation to fault diagnosis and calibration. The Starbuck Data Company people have had the good sense to realize their hardware is likely to be used in so many differing situations that anyone from a casual hobbyist to a specialist engineer needs to be catered for. The softbound manual is arranged in such a way that the engineers won't be disappointed; the more advanced information (including the circuit diagram of the 8882) can be skipped by the less demanding user. It's refreshing to see such information made available rather than kept under a shroud of secrecy.

The possible applications of the 8882 are well covered. Starbuck catered to people wishing to build extra interface circuitry by providing suggested schematics for measuring external parameters such as temperature and solar radiation (which makes the unit perfect for solar energy enthusiasts). If meteorology is your interest, a wind-speed monitor setup is suggested using a typical anemometer such as the Maximum A75-104. For newcomers to the field of analog interfacing, a short tutorial gives some background, though judging by a few references to certain terminology, some electronics knowledge is assumed.

The circuit diagrams in the manual are simple op-amp designs with a few accompanying components, amounting to about $5 worth of parts. One of the most exciting possibilities mentioned is interfacing to a Sears Roebuck BSR-X10 master control unit allowing ultrasonic control of household items such as lights and dimmers with your TRS-80.

The final section of the manual contains all the software listings required to use the 8882. This software is also available on disk as part of the complete system or separately if required. Included in the software package are test programs for submitting the unit to diagnostic checks, programs allowing the units to be used from Basic or from the machine code level, and a description of a method of use in an interrupt-driven mode. A couple of games (Brickout and Ping-Pong) are included enabling the use of joysticks normally supplied for the Color Computer. The use of the software is fully described in a 13-page section of the manual. The manual is extremely comprehensive and greatly enhances the usefulness of the hardware.

The hardware is literally a black box and acts in a traditional black box fashion: Signals are input through one side of it, and after being processed, emerge on the other side in a different form. The top of the box has three rows of eight screw-on terminal pairs; two rows are for digital I/O, and one row is for analog input. Two DIN sockets are provided for handling the joystick inputs.The box measures 8 by 7 by 3 inches making it a reasonable size to have next to your TRS-80.

Power is supplied in the form of 12 volts ac at 200 mA from a small wall transformer. I have reservations about this kind of power supply for a number of reasons. There is a small chance that by inserting or removing the 12-volt supply from the 8882 you could short out the mini-jack plug and damage the power supply transformer. You are warned against this in the documentation, but the problem could have been entirely eliminated by having the supply integral within the box. It also means you can't switch the unit off by removing ac power to it from a single switch unless you resort to a switched multi-way ac outlet.

The unit is nothing short of excellent as regards its use in data acquisition and control on a micro. The uses for this type of hardware are as many and varied as the uses of the computer itself. The inputs available can be either digital or analog and are addressed from the TRS-80 via ports 160 and 161 (A0 and A1 hexadecimal) on the Model I version. The Model III

HAPPINESS IS...NEWSCRIPT™

THE WORD PROCESSOR FOR BUSINESSMEN AND PROFESSIONALS

We offer you ongoing support by answering your questions and providing reasonably priced enhancements.

A FEW OF NEWSCRIPT'S STANDARD FEATURES:

*Form Letters with merging of names and addresses
*Gives superb appearance to your final documents
*Comprehensive manual with hundreds of examples
*Centering, top/bottom titles, indents, pagination
*Underlining, boldface, double-width, italics†
*Sub-scripts, super-scripts, proportional pitch†
*Generates Table of Contents, sorted Index
*Allows block graphics, special symbols†

*Search and replace globally or within a range
*Block move, copy, delete, insert from other file
*AUTOSAVE, WHOOPS, DIRECTORY, KILL, REPEAT

*Based on IBM's "EDGAR" and "SCRIPT" systems
*Supplied ready-to-run on "tiny" DOSPLUS
*Easily transferred to NEWDOS, NEWDOS/80, LDOS, TRSDOS
*Includes handy Quick Reference Card

NEWSCRIPT CONTROLS THESE PRINTERS:

*EPSON MX-80, MX-100: all 12 fonts, plus underlining and block graphics; italics with GRAFTRAX
*Ceatronics 737, 739; Radio Shack L.P. IV, L.P. VIII, Prowriter, Daisy Wheel II, NEC PC-8023A, TEC 8500R, C.ITOH 8510: Right-justified true proportional printing
**Good support for: Diablo, Spinwriter, Starwriter, QUME, Microline, Anadex, modified Selectric, standard line printers*

NOW AVAILABLE: right-justified true proportional support for Diablo, Spinwriter, Starwriter, and Qume (DaisyWheel Option)**

TYPICAL USER AND REVIEWER COMMENTS:

"There is a new word processor on the market that will change the way people think about the capabilities of the TRS-80. Imagine a powerful mainframe text editor running on a TRS-80, with virtual compatibility between the two versions...on-going support second to none, with superb documentation." (Jim Klaproth, 80-U.S. JOURNAL February, 1982)

the manual:

"It definitely rates the first '10' given to any documentation reviewed in this column." (A.A. Wicks, COMPUTRONICS, October, 1981)

the software: "An excellent Word Processor" (D.N.); "Absolutely fantastic" (S.E.S.); "You have features that I cannot duplicate on my $14,000 system" (J.B.)

the support: "Your phone information system and the prompt and courteous staff that you provide to help your clients...are worth the cost of the system." (V.N.N.)

REQUIRED CONFIGURATION: 48K TRS-80 with one disk drive. Specify Model I or Model III.

† Some features work only if your printer has the mechanical capability.

** DaisyWheel proportional is extra-cost option.

NEWSCRIPT 7.0:	**$124.95**
MAILING LABELS OPTION:	**29.95**
Special: NEWSCRIPT + LABELS:	**139.95**
Daisywheel Proportional Option:	**49.95**
"PENCIL"/"SCRIPSIT" File Convertor:	**14.95**
Manual Only (180 pages):	**30.00**
Reference Card Only:	**2.50**
Electric Webster + Correction Feature:	**149.50**
Graphics Editor and Programmer:	**45.95**
GEAP & Dotwriter (Hi-Res. letters):	**74.95**
DOSPLUS 3.4:	**149.95**

TO ORDER, CALL NOW, TOLL-FREE:

(800) 824-7888, Operator 422
CALIF: (800) 852-7777, Oper. 422
ALASKA/HAWAII: (800) 824-7919
FOR TECHNICAL INFORMATION CALL:
(213) 764-3131, or write to us.

Order from your Software dealer, or from:

PROSOFT™

DEPT. C, BOX 560 • NO. HOLLYWOOD, CA 91603

TERMS. We accept VISA, Mastercard, checks, Money Orders, C.O.D. and even cash. We pay shipping via surface UPS inside U.S.A. Please add $3.00 for Blue Label, 6% tax in California, and 15% outside North America (air shipment).

version uses different ports, to be exact, 96 and 97 (60 and 61 hexadecimal), for the analog and digital inputs.

The port errangement can be custom configured at the factory allowing the use of the unit where ports are already in use and giving the option of chaining units together for more than eight enalog channels. The output from the 8882 is in digital form only (from the same port number as the digital input).

Although only a single port is used for analog input, eight channels are accommodated by a very sensible method: When an analog input is required by a program, a signal is sent to tell the unit to initiate an analog-to-digital conversion—this same signal also tells it which one of its eight channels is to be sampled. This is done by outputting the numbers zero to seven to the analog port.

The conversion from analog is done to a resolution of eight bits, meaning you'll get a number from zero to 255 proportional to the voltage present on that particular channel. The range of analog voltages handled is from zero to 5 volts and accuracy of the conversion process is plus or minus one bit or 20 mV—that is about 20 thousandths of a volt—and is accurate enough for most needs.

Inputs above 5 volts can be easily dealt with using simple voltage divider circuitry. The 8882 is protected up to voltages of 200 volts positive or negative so it forgives the slip-ups at the experimental stages of an application. The time taken for the hardwere to sample a voltage and convert it to e number is a staggering 150 microseconds—end that is quick! Using machine code it's possible to read data at the rate of 4,000 inputs per second; I don't foresee many uses on any microcomputer that would require data gathering any faster than that.

Digital input and output is handled at the bit level. By reading the digital input port, a byte is returned in which each bit corresponds to a single digital channel. Simply stated, this means that with digital input you see a one if a switch is open and a zero if it's closed. By attaching microswitches to doors or windows, it would be possible for the computer to check if anything was left open, making simple alarm systems a real possibility.

Digital output is handled the same way except in reverse; each bit in an output byte controls a separate output channel. So, to output to a single channel necessitates keeping track of other output channels using a software mask. The mask ensures that changing one channel leaves the other channels in their predetermined states. When e digital channel is turned on, a current of 50 mA can pass through it; each channel is controlled by a latched optoisolated driver. The optoisolation means the unit is kept at a safe distance from any stray voltages which may accidentally creep into your control circuitry. This is necessary because it's possible to drive heavy relay-controlled equipment involving voltages hazardous to you or your microcomputer. Optoisolation provides protection from voltages up to 1,500 volts if you decide to tempt fate with such mistakes. The fact that the outputs are latched means once the channel is switched on or off, it remains in that state until another command is issued from the digital output port.

By now, you should be able to foresee many possible applications for a data acquisition and control unit such as this. The only extra that could have been provided would have been en analog output. Even this can be achieved by using an electronic ladder network on the digital outputs to sum the voltages; up to 256 different voltage levels can be attained. The sky's the limit—you can now control the world from your TRS-80. ■

Star Blaster
The Micro Works
P.O. Box 1110
Del Mar, CA
Color Computer
$39.95 cartridge

by Jake Commander

Star Blaster is a real-time version of the arcade game Asteroids written in 6809 machine code, and the action is as fast and furious as the original version. The game is played with joysticks or a predefined set of keyboard characters that move the mother ship and fire missiles. I enjoy the game more with joysticks; it's closer to an arcade game.

For those of you unfamiliar with Asteroids, it consists of a missile-firing spaceship located somewhere in an asteroid-infested quadrant deep in the uncharted depths of space. No one in his right mind would actually pilot a rocket ship to such a place, but that's where your ship is during the game. The idea is to shoot to pieces all asteroids in sight before they smash into you and destroy your ship. The ship can fire missiles and move around to dodge the debris.

Micro Works' version starts with a generous supply of five ships. Pushing left or right on the joystick (or pressing the appropriate keys) rotates the ship through 360 degrees, whereas a forward push gives the ship a kick of power that jolts it in the direction it's facing.

Like the arcade version, this takes a little skill, since the ship gains momentum and continues until it decelerates under some undiscovered law of physics. Unless you've passed your advanced space-driving test, you're likely to crash your ship into a lump of rock. This is where Star Blaster has its own custom trick. By pulling back on the stick, a bubble-like shield surrounds your ship and prevents any asteroids from coming into contact. This is only advised as a panic measure, since under these circumstances, the bubble containing your ship is gently nudged through space, leaving you to decide when to make a break for it.

As if this isn't enough to drive any normal space-pilot back to driving a bus on Terra Firma, various sizes of flying saucers randomly enter your quadrant and take pot-shots at you. It's just one of those facts of space-life, and naturally you have to defend yourself by counter-attacking or dodging the missiles raining down upon your ship.

Star Blaster awards points according to the difficulty of the targets you hit. Every time you earn 10,000 points, you are rewarded with a beep and an extra ship. If Micro Works had any compassion, an aspirin would also be awarded at this point.

The program uses only two colors, black and light-green. This is the equivalent video mode in Basic as PMODE 4 and SCREEN 1,1. It's not the prettiest of the Color Computer's displays but the software's designer has opted for maximum resolution.

The documentation is a card outlining the basic rules and scoring system. To be fair, this is no more or less than the instructions available on any arcade machine. Sound is also an integral part of the game, but is only a minor part of the overall package when compared with the quality of the display.

Star Blaster is only available in cartridge form, which accounts for its relatively high cost. Remember—this is not merely software but firmware; what you buy is a package consisting of a read-only memory (ROM) contained within a plastic cartridge. One attraction of this arrangement is the luxury of "instant software" with no loading problems. You just plug in, switch on and play.

I recommend Ster Blaster to any arcadophile. It's a definite must for the game library.■

Color Pac Attack
Computerware
Encinitas, CA 92024
16K Color Computer
$24.95 cassette
$29.95 disk

by **Mex Treece**

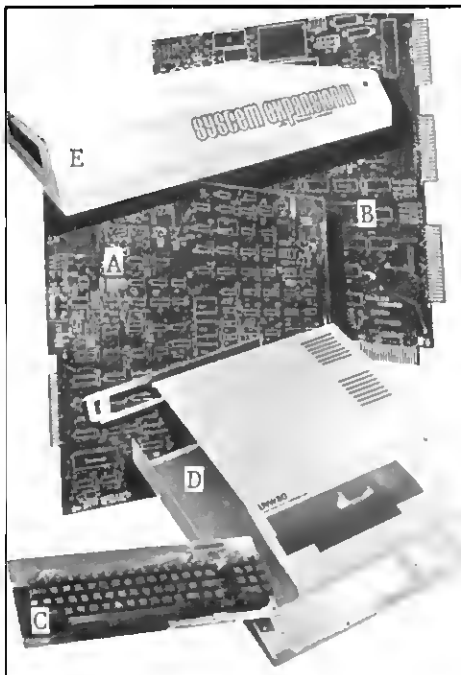
Color Pac Attack is the Color Computer's version of the popular arcade game.

After a musical fanfare at the start of the game, the Pac person you control with a joystick tries to consume proton pellets around a maze while trying to avoid being caught by three muggers. The three muggers (Huey, Dewey, and Louie) start the game in a box in the center of the screen and chase the Pac person around the maze. If Pac person gets to a proton energizer (a large pellet) it gives you the power to attack, but only for a few seconds. During this short time, the muggers turn blue and white and flee from the Pac Person; but with your incredible energy you can travel faster to catch them. Catching the muggers gives you 200, 400 or 600 points and sends them back to the box in the center of the screen. You are chased around the maze as you consume the proton pellets, energizers, and muggers until you're caught three times. If you clear the screen of pellets and energizers, you're rewarded with another full screen and you start again.

If you just play for points you need to know about the apple. The apple sometimes appears on the screen below the muggers box, but only for a few seconds. If you consume the apple you get a 300 point bonus. Current score and the high score during any one game are displayed at the top of the screen. The game has three skill levels—easy, hard, and tuff; you set these by the joystick at the beginning of the game. The program comments on your choice, calling you a rookie if you choose easy saying "bad news" if you choose tuff. The higher levels of skill speed up the pace of the characters and also limit the number of proton energizers around the edge of the screen. The easy level starts with 10 energizers; the hard and tuff levels have eight and four.

The muggers travel as fast as the Pac person (except when he is energized) so you can always stay ahead of them. If you and a mugger are an equal distance from a proton energizer and approaching each other, don't try to beat the mugger to the energizer. The mugger will always win and will eat you before you get energized. After hours of play, I learned this the hard way. Pac Attack is similar to the arcade game. The pellets are larger and fewer in number but the maze is more complex, which makes this game equally exciting and challenging. There are more energizers at the easy skill level than in the arcade game, but that may be a welcome sight to the beginner. The Pac Attack game is played much faster at the tuff skill level than the arcade version. The color and sound on both versions are dynamic and add to the pressure as the game progresses. If you're looking for a game to provide hours of challenges and rewards without bullets, missiles and bombs, then I recommend Color Pac Attack. ■

COMPUTER KITS – FROM $69.95



LNW SEMI-KITS can save you hundreds of dollars. By obtaining your own parts at the lowest possible cost and assembling the **LNW SEMI-KITS,** you can have the most highly acclaimed microcomputer in the industry – the **LNW60.** The **LNW SEMI-KITS** are affordable modules. You can start with a modest cassette system and expand to a full **4Mhz** TRS-80 compatible system with 5 or 8 inch double density disks and color at any time.

A. LNW60 CPU – Made of high quality FR4 glass epoxy double sided circuit material, with plated-through holes and gold edge connector. It is fully solder-masked and silk screened. Here are just some of the outstanding features you will have when your **LNW60** CPU board is fully assembled: • 16K RAM • Color and black and white video • 480 x 192 high resolution graphics • 64 and **80** column video • 4 Mhz Z80A CPU • Upper and lower case display • 500 and 1000 baud cassette I/O –**$69.95**

B. SYSTEM EXPANSION – Expand the **LNW60** computer board, **TRS-80** and **PMC-80** computer with the following features: • 32K memory • Serial RS232C and 20Ma port • Real time clock • Parallel printer port • 5 inch single density disk controller • Expansion bus (screen printer port) • Onboard power supply • Solder-masked and silk screened legend – **$88.85** (tin plated contacts) – **$84.95** (gold plated contacts)

C. KEYBOARD – 74 key expanded professional keyboard – includes 12 key numeric keypad. Fully assembled and tested. – **$99.95**

D. COMPUTER CASE – This stylish instrument-quality solid steel case and hardware kit gives your **LNW60** that professional factory-built appearance. – **$64.95** Add $12.00 for shipping.

E. SYSTEM EXPANSION CASE – This stylish instrument-quality solid steel case and hardware kit gives your **SYSTEM EXPANSION** interface that professional factory-built appearance. – **$59.95** Add $10.00 for shipping.

F. LNW60 CPU – HARD TO FIND PARTS KIT – **$62.00**

G. LNW60 VIDEO – HARD TO FIND PARTS KIT – **$31.00**

H. SYSTEM EXPANSION – HARD TO FIND PARTS KIT – **$27.50**

I. LEVEL II ROM set. (6 chip set) – **$120.00**

VISA and **MasterCard** accepted. Add $3.00 for shipping plus $1.00 for each additional item. All shipments via UPS surface. Add $2.00 for U.S. Mail. Shipments outside continental U.S.: funds must be U.S. dollars. Sufficient shipping costs must be included with payment.

ORDERS & INFORMATION – (714) 544-5744
SERVICE – (714) 641-8650

LNW Research Corp.
2620 WALNUT Tustin, CA. 92680

↙33

↙ See List of Advertisers on page 338

SFINKS 3.0 CHESS PROGRAM

PRIZE WINNER
1981 Paris World Microcomputer Chess Championship

the finest available!
See 80 U.S. June 1982

•32 book openings
•chess clock
•printer output
•problem mode
•audio alert
•thinking on opponent's time
•infinite levels

32K
Model 1 (E.I.) or Model 3
tape or disk
only
$39.95

SFINKS 1.81
Plays Chess Pro Chess and Transcendental Chess

PRIZE WINNER
1980 San Jose U.S. Microcomputer Chess Championship

•nine levels
•problem mode
•move suggestion
•move take back
•audio alert
•good documentation

32K
Model 1 or 3
tape or disk
only
$24.95

SFINKS CHESS TUTOR
Learn to play chess

Step-by-Step Programmed Learning for the Newcomer

•tutor
•3 level game
•problem mode
•audio alert
•printer output
•book openings
•superb graphics

32K
Model 1 or 3
disk only
only
$19.95

Please specify tape or disk and Model 1 or 3 for each $2.00 shipping.
WILLIAM FINK
SUITE 2[illegible]
1[illegible]5 N. MAIN ST.
GAINESVILLE, FL
32[illegible]1

EXCEPTIONAL DEALER DISCOUNTS
(904) 377-4847

✓212

SFINKS

80 REVIEWS

Tower of Orlandor
Compu-things
Suite #2
270 Broadway
Revere, MA 02151
$14.95, cassette Model I & III

by **Aaron Silverstein**

Tower of Orlandor, a new graphics-based adventure program, is not a Scott Adams-style adventure, but an invisible maze graphically depicted from an overhead view.

The game begins in an empty square, with the player represented by a blinking graphic block. Using the arrow keys, you blunder around in the dark until you hit a wall of the maze, which lights up, showing its location. Some walls have traps that, if activated, deduct life points from the player.

The tower has 10 levels. On each level is a hidden trap door that, once found, lets you pass down to the next floor until you reach the ground floor and (presumably) safety.

Much is left to the imagination. Missing is the verbal interaction of traditional adventure, the frustrating three-dimensional maze images of the Med-Systems series, or even the room shapes of Gauntlet of Death. There is the feeling of being lost in a dungeon (and there are treasures and potions to obtain), but author Dave Huntress would have us extrapolate every detail of the game except that which appears sparingly on the screen from time to time to tell us we've hit something or found something.

At $14.95, the program is aimed at the younger crowd, who need a game simple enough to play but complex enough to hold their attention. Tower of Orlandor does that. For the sophisticated Adventure/Deathmaze/Trapmaze player, this program will fall short of his expectations. ■

Conflict 2500
Avalon Hill
4517 Harford Rd.
Baltimore, MD 21214
Model I & III
$16 cassette, $21 disk

by **Mark E. Renne**

Conflict 2500 is a radical departure from first generation one-ship Star Trek games.

The first part of the game involves setting the scene. You may choose one to 10 hyperfighters for the good guys, one to 20 planet pulverizers for the bad guys, and up to 10 planets and 10 bases from which you get power. The object is to chase the bad guys attacking the planets and either fire at them or leave a mine for them to run into.

Play begins with a galactic report showing the universe as a 9 by 13 grid indicating your ships, planets and bases. Attacks on planets or ships are reported to you in verbal messages. The grid is then redrawn. You then move to one of your ships and get a 2000-by 1600-megameter tactical view. Each sector is 1000 square megameters. Planet pulverizers are not shown on the grid, but you may fire once at them. Any angle from 0–360 degrees is permissible. The energy used is 50 times the power behind the blast. You can then set a mine for the enemy to run into or you may take off. The planet pulverizers will return fire on you or your planet. To move, indicate heading (0–360) and velocity (0–5,000). Your ship will move in this direction and velocity until you change it. This is annoying because you have to change direction and velocity every move or your ship will miss its intended target.

To gain energy you can dock with a base, planet, or another ship. Planets refuel to 30,000, bases to 10,000. Ships may transfer any available amount among each other. Maximum energy is 30,000. You have twice as many mines as ships; each mine must be set and armed. To avoid being destroyed by your own mine, you must be 500 megameters away by the next move. Mines are most effective when positioned on top of the planet pulverizers.

The game is well-documented and the instructions are clear and concise; however, playing the game is very dull. There is no real time. Graphics are slowly drawn set-reset graphics and redrawn each time you change ships. If you play the game one-on-one, the computer's ship is not drawn and you must wait for it to appear; or you can search 117 sectors looking for it. If you use multiple ship scenarios the play becomes intolerably slow as individual ship information must be fed in and all previous information neutralized. Planet pulverizers are difficult to destroy and the game seems endless. There is also no way to save a game in the middle for future play. A summary at the end of the game indicates the outcome based on fleets, bases and so on. All in all this type of strategy game needs more excitement or should be left to pencil, paper, and the user's imagination. ■

M I & M III DOSPLUS 3.4 $110.

HARD DISK III **$2895**

6.3 MEG TANDON WINCHESTER with Dosplus 4.0 ready to plug in as Drive :4 and run.

MODEL III 48K COMPUTERS

1 Single-sided 40 TRK Drive	$1695.
2 Singlesided 40 TRK Drive	1895.
2 Singlesided 40 TRK Drives/RS232	$1973.
2 Singlesided 40 TRK/RS 232 & MODEM	$2073.
1 Doublesided 40 TRK Dive	$1820.
2 Doublesided 40 TRK Drive	$2145.
1 Singlesided 80 TRK Drive	$1845.
2 Singlesided 80 TRK Drive	$2175.
1 Doublesided 80 TRK Drive	$1995.
2 Doublesided 80 TRK Drive	$2395.

MIII DISK CONTROLLER KITS

A.M. ELECTRONICS	$350
J&M SYSTEMS	$350
V.R. DATA	$350

DISK DRIVES

40 TRACK TANDON BARE	$230.
40 TRACK TANDON/CASE & SUPPLY	$275.
80 TRACK TANDON BARE	$320.
80 TRACK TANDON/CASE & SUPPLY	$365.

Cases are well-vented/Hard card edge extender on back.

PRINTERS

C. ITOH F-10	$1650.
OKIDATA 82A	$ 525.
OKIDATA 83A	$ 725.
EPSON MX-80/GRAFTRAX	$ 519.
EPSON MX-80 F/T/GRAFTRAX	$ 675.
EPSON MX-100/GRAFTRAX	$ 875.

MODEMS

MICROCONNECTION RS 232	$159.
MICROCONNECTION RS232 - Auto dial/answer	$199.
Hayes Stack Smart Direct	$259.

- **90 Day Warranty**
- **One Year Extended Warranty Available**

ASG AUTHORIZED SALES AND SERVICE CENTERS

Douglasville, GA.....(404) 949-4204

W. Palm Beach, FL.....(305) 686-3550

Lancaster, OH.....(614) 687-1019

all Systems Go ©1981

638 S. Dillard St.
West Orange Shopping Cntr.
Winter Garden, FL 32787-0915

Voice: 305-877-2830
DATA: 305-877-2829

EPSON
Factory Authorized Service Dealer

ORDERS ONLY:

1-800-327-6590

Call or write for free brochure:
U.S. PRICES F.O.B. WINTER GARDEN, FL
Radio Shack is a registered trademark of Tandy Corp.

178

See List of Advertisers on page 338

CALL TOLL FREE
800 424-2738

Annual Summer Madness
Sale 20% OFF
Sale Ends Aug. 10

SCARF-MAN

From Comsoft Grop
Race your Scarfman around a maze, gobbling up scoring dots. You are pursued by five monsters: if you eat a "+" they'll lower their eyes and you can eat them, otherwise they'll eat you! SCARFMAN may be played using the keyboard, Alpha Joystick or Triastick.
WARNING: MAY BE HABIT-FORMING! Save 20%!
32K Disk ..... ~~$29.95~~ 16K Tape ..... ~~$16.95~~
NOW THRU AUG. 10 YOU PAY JUST ... 16.76 32 K Disk
13.56 16K Tape

LUNAR LANDER

By Wall & Moncnet from Adventure Int. You get a vast lunar landscape, graphically depicted in both long range and close up, with many choices for landing sites. Choose a more difficult site and get more points—if you can land successfully. Great graphics and sound add to the realtime challenge and fun. Joystick compatible
32K disk ..... ~~$29.95~~ 16K tape ..... ~~$14.95~~
NOW THRU AUG. 10 YOU PAY JUST ... $16.76 32K disk
Save 20%! **$11.96 16K tape**

PENETRATOR

By Phillip Mitchell from Beam
Armed with missiles and bombs, you must fly your fighter to the enemy's cache of neutron bombs and destroy them. Your mission is in four stages, involving rugged terrain, caverns and manmade obstacles—not to mention enemy radar, missiles and paratroopers. This new departure in arcade gaming allows you to set up your own terrain and enemy emplacements, then save them for future use. Make your mission as hard or easy as you like. Joystick compatible. Save 20%!
16K Tape or 32K disk ..... ~~$24.95~~
NOW THRU AUG. 10 YOU PAY JUST $19.96

SPACE CASTLE

From Comsoft
Ahead of you lies the menacing castle, floating in space amidst its layers of orbiting shields. At intervals, smart mines spin off the shields and head for your ship. Dodging the mines and destroying the shields isn't your only problem, though: once you penetrate the innermost shield, The evil Yugdab will unleash all his fury in an attack! A fast-paced and challenging arcade game, indeed. Joystick compatible. Save 20%!
16K tape ..... ~~$15.95~~ 32K disk ..... ~~$19.95~~
NOW THRU AUG. 10 YOU PAY JUST ... $12.76 16K tape
$15.96 16K disk

GALAXY INVASION

By Hogue & Konyu from Big-Five
"The rage of the arcades" is now available for TRS-80! Exciting sound effects add to the action as the invaders swoop down to destroy your base. Even while you have your hands full battling the aliens, you have to watch out for the Flagship! Super, graphics, super action, super fun! Joystick compatible.
16K tape ..... ~~$15.95~~ 32K disk ..... ~~$19.95~~
NOW THRU AUG. 10 YOU PAY JUST .. $12.76 16K tape
Save 20%! **$15.96 32 K disk**

NEW ROBOT ATTACK VOICE Sound Effects

By Hogue & Konyu from Big-Five
One of the top names in TRS-80 arcade games adds a new dimension: voice sound effects! It's you against the robots in this fast-moving shoot-em-up. Electrified Mazes and the "Flagship" complicate things as you stalk the evil androids.
The innovations built into ROBOT ATTACK take your TRS-80 near the limits of its capabilities. You MUST see and hear it! Joystick Compatible. Save 20%!
16K tape ..... ~~$15.95~~ 32K disk ..... ~~$19.95~~
NOW THRU AUG. 10 YOU PAY JUST ... $12.76 16K tape
$15.96 32K disk

COSMIC FIGHTER

By Hogue & Konyu from Big-Five
Terrific sound, graphics and unique challenges mark this space game a winner! While fighting off the alien convoys—each more skillful than the last—you must keep track of your rocket fuel or risk explosion. Finally your space station appears. Can you dock immediately, or is the station overrun by aliens? Find out by ordering Cosmic Fighter today. Joystick Compatible.
16K tape ..... ~~$15.95~~ 32K disk ..... ~~$19.95~~
NOW THRU AUG. 10 YOU PAY JUST ... $12.76 16K tape
Save 20%! **$15.96 32K disk**

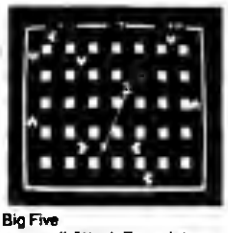
SUPER NOVA

By Hogue & Konyu from Big Five
Asteroids surround your ship. You must shoot the asteriods, as well as any of the five types of alien spaceships. Use your thrusters for full movement and rotation of your ship—if you are overwhelmed, you can even jump to hyperspace! Written in fast machine code with superb graphics, this game is GREAT! Joystick Compatible.
16K tape ..... ~~$15.95~~ 32K disk ..... ~~$19.95~~
NOW THRU AUG. 10 YOU PAY JUST ... $12.76 16K tape
Save 20%! **$15.96 32K disk**

–80 SPACE RAIDERS

From Bosen Electronics
You are in command of the Starship "Defiant." The center of the screen is your window to the vastness of three dimensional space. Your orders are simple enough: Patrol the area and destroy all enemy spacecraft; return to base as needed for repairs and supplies. Carrying out these orders is more difficult! An exciting and fast-paced game, it presents an animated pilot's-eye view. Save 20%!
16K tape ..... ~~$24.95~~
NOW THRU AUG. 10 YOU PAY JUST $19.96

ATTACK FORCE!



By Hogue & Konyu from Big Five
Unlike the usual "shoot-em-ups," Attack Force lets you control both speed and direction as you maneuver all over the screen in search of the alien Ramships and Flagships. Enemy ships chase you everywhere, and the Flagships' lasers can fire in any direction! The Ramships can even impersonate your spacecraft, so don't look away even for an instant. Machine language action with sound. Joystick Compatible.
16K tape ..... ~~$15.95~~ 32K disk ..... ~~$19.95~~
NOW THRU AUG. 10 YOU PAY JUST ... $12.76 16K tape
Save 20%! **$15.96 32K disk**

StarFighter

By Sparky Starks from Adventure Int.
As mercenary and galactic police officer, you must maintain the condition and control of all parts of your spacecraft. You sit at the controls while peering out of the digital spaceview port. Suddenly something appears on your screen: is it a Starpirate or a friendly merchant ship? You can't tell yet, and at this speed you may have only a fraction of a second to make an attack/no attack decision.
16K tape ..... ~~$24.95~~
32 disk ..... ~~$29.95~~
NOW THRU AUG. 10 YOU PAY JUST ... $19.96 16K tape
Save 20%! **$23.96 32K disk**

Visit our other stores: Seven Corners Center • Falls Church, VA & W. Ball Plaza • 6600 Security Blvd. • Baltimore, MD

TO ORDER CALL TOLL FREE 800 424-2738 For information Call **(202) 363-9797**

VISA **the PROGRAM STORE** –80 MasterCharge
4200 Wisconsin Avenue, NW, Dept. 8E206 Box 9609
Washington, D.C. 20016

MAIL ORDERS: Send check or M.O. for total purchase price, plus $1.00 postage & handling. D.C., MD. & VA.: add sales tax. Charge cards: include all embossed information on the card.

the PROGRAM STORE™

CALL TOLL FREE
800 424-2738

By Jeff Zinn from Big Five
This new arcade game from Big Five continues their tradition of bringing you the most exciting action in innovative space games. Your fighting spacecraft must run the gauntlet of the attacking alien's weaponry in order to accomplish your defense mission. You'll use all your skill and dexterity just to survive! Joystick Compatible.
Save 20%!
16K tape ..... ~~$15.95~~ 32K disk ..... ~~$19.95~~
NOW THRU AUG. 10 YOU PAY JUST ... $12.76 16K tape $15.96 32K disk

ARMORED PATROL

By Westmoreland & Gilman from Adventure
As commander of a lumbering T-36 tank you have the firepower to destroy the enemy—if you can find them. They may be hiding behind the houses scattered about, the bleak terrain and your only view is thru the drivers port (your screen). Impressive animation in this arcade game.
Save 20%!
16K tape ..... ~~$19.95~~ 32K disk ..... ~~$24.95~~
NOW THRU AUG. 10 YOU PAY JUST ... $15.96 16K tape $19.96 32K disk

VOYAGE OF THE VALKYRIE

By Leo Christopherson from AOS
Combine the animation and music techniques pioneered by Christopherson with the challenge of his first fast-moving arcade game and you have VOYAGE OF THE VALKYRIE! You speed through a magical maze guarded by ferocious birds that swoop down to attack. If you don't get them first. To list all the play and options of this exciting game would take the 16 pages of instruction included.
Save 20%!
16K tape ..... ~~$34.95~~ 32K disk ..... ~~$39.95~~
NOW THRU AUG. 10 YOU PAY JUST ... $27.96 16K tape $31.96 16K disk

METEOR MISSION 2

By Hogue & Konyu from Big-Five
Six astronauts are stranded on a desolate planet. You must undock from your command module and maneuver your rescue shuttle through the asteroid field to save them. You can only save one at a time, and each landing burns away parts of your landing sites. Order this realtime action game now or live with the astronauts' pitiful screams forever. Joystick Compatible.
Save 20%!
16K tape ..... ~~$15.95~~ 32K disk ..... ~~$19.95~~
NOW THRU AUG. 10 YOU PAY JUST ... $12.76 16K tape $15.96 32K disk

CATERPILLAR

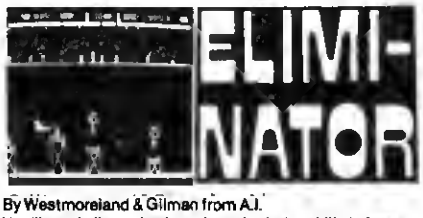
©1982 Soft Sector Marketing Inc.
Save 20%!
16K tape ..... ~~$15.95~~ 32K Disk ..... ~~$19.95~~
NOW THRU AUG. 10 YOU PAY JUST ... $12.76 16K tape $15.96 32K disk

DEFENSE COMMAND

By Hogue & Konyu from Big Five
You are the lone defender of 10 Krotnium fuel cells essential for the survival of the planet. Aliens swoop down from above to steal the fuel; it's your job to destroy them. You can still save the cells after a raid, but you must shoot the alien and simultaneously move under the cell to catch it. If things look bad you can set off one of your 4 antimatter bombs and destroy all enemies on the screen! Arcade fun with action and sound. Joystick Compatible.
Save 20%!
16K tape ..... ~~$15.95~~ 32K disk ..... ~~$19.95~~
NOW THRU AUG. 10 YOU PAY JUST ... $12.76 16K tape $15.96 32K disk

MISSILE ATTACK

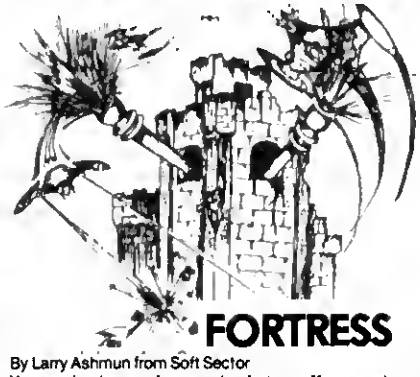
By Phillip Oliver from Adventure Int.
You must use your twin silos of ABMs to fend off barrage after barrage of enemy missiles that rain down toward your cities. As your skill increases so does the difficulty and speed of this machine language arcade game. Watch the skies and may your aim be true! MISSILE ATTACK has sound and fast-moving graphics galore.
16K tape ..... ~~$14.95~~ 32K disk ..... ~~$20.95~~
NOW THRU AUG. 10 YOU PAY JUST ... $11.96 16K tape $16.76 32K disk
Save 20%!



By Westmoreland & Gilman from AI.
You'll need all your keyboard manipulative skills to keep up with the action in this arcade game. You travel across the planet's low-altitude airspace in an effort to prevent the marauding enemy from capturing your energizer cells. All manner of alien craft await your arrival with destructive forces. For 1 or 2 players, with sound.
32K disk ..... ~~$24.95~~ 16K tape ..... ~~$19.95~~
NOW THRU AUG. 10 YOU PAY JUST ... $19.96 32K disk $15.96 16K tape
Save 20%!

Crush, Crumble and Chomp!

From Epyx
Save 20%!
It's a monster movie, and you are the monster! You can be The Glob, Krakan, Mantra, Machismo, Arachnis, or Goshilla—or even design your own "custom" monster (disk version only). This hilarious action game is loaded with graphics and sound as you practice your villany.
16K tape or 32K disk ..... ~~$29.95~~
NOW THRU AUG. 10 YOU PAY JUST $23.96



FORTRESS

By Larry Ashmun from Soft Sector
You are in charge of a massive fortress. Your number one priority is its defense against alien attackers. With your protection and firepower, fending off the first attackers is like swatting flies—but just wait!! Joystick Compatible.
16K tape ..... ~~$15.95~~ 32K disk ..... ~~$19.95~~
NOW THRU AUG. 10 YOU PAY JUST ..... $12.76 tape $15.96 disk
Save 20%!

INVADERS FROM SPACE

By Carl Miller from Acorn
A fast machine language approach to this classic (and addictive) space game. The aliens drop bombs and move from side to side trying to overrun your bases. You choose the speed, enemy bomb frequency and accuracy, your number of shots on screen and bases. Unlike most such games, you can move your base and simultaneously fire at the invaders. Full sound effects add even more excitement to the incredible action of INVADERS FROM SPACE. Fun for all ages and skill levels.
Save 20%!
16K tape ..... ~~$44.95~~ 32K disk ..... ~~$29.95~~
NOW THRU AUG. 10 YOU PAY JUST ..... $11.96 tape $16.76 disk

ALIEN ARMADA

By Waldron Hodsdon from Liberty
Hmmm. Looks like another "Space Invaders" type game. Nice neat racks of aliens poised over your defensive base... but WATCH OUT! Here they come, swooping down with their bombs and Kamakazi-like dives. There are individual attackers plus group flights—all intent on destroying your three bases before you destroy them. ALIEN ARMADA allows up to two players and has three levels of difficulty from beginner to expert.
Save 20%!
16K tape ..... ~~$13.95~~ 32K disk ..... ~~$17.95~~
NOW THRU AUG. 10 YOU PAY JUST ... $11.16 16K tape $14.36 32K disk

THE PROGRAM STORE • Dept. 8E208 Box 9606 • 4200 Wisconsin Avenue, NW • Washington, D.C. 20018

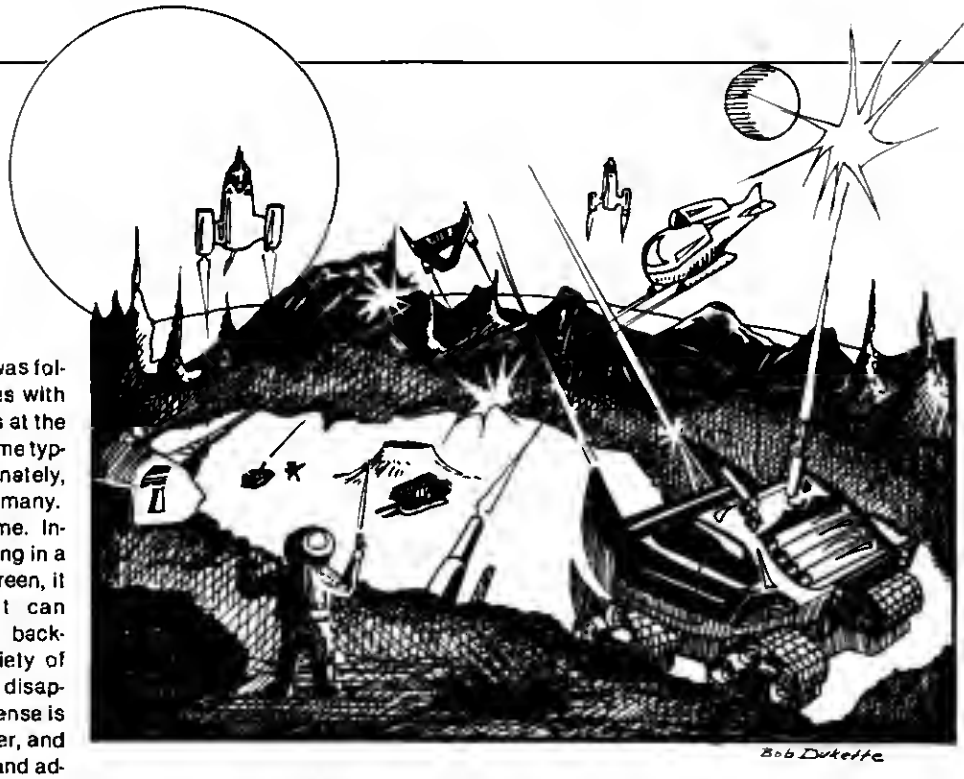
Item | Tape/Disk | Price

Postage $1.00
Total

☐ CHECK ☐ VISA
☐ MASTERCARD Card #

name
address
city state zip
Exp

See List of Advertisers on page 338



Alien Defense
Soft Sector Marketing
6250 Middlebelt
Garden City, MI 48135
Models I & III
$15.95 16K cassette
$19.95 32K disk

by Tim Knight

The legendary Space Invaders was followed by a multitude of games with good guys at the bottom and aliens at the top of the screen. This format became typical of most space games. Unfortunately, this format also became boring to many.

Enter the vertically played game. Instead of the player's spaceship being in a position near the bottom of the screen, it is located near the middle. It can maneuver up, down, forward and backward. The player shoots at a variety of deadly aliens and has the option of disappearing into hyperspace. Alien Defense is based on the arcade game Defender, and is just as interesting, challenging, and addictive.

How to Play

Thanks to the author's consideration of the user, there is a small demonstration of the ship shooting at the different types of aliens. The first to appear is the lander, which is worth 100 points. The lander is the most common and easy to shoot down. The mutant is worth 150 points. It bounces around quickly, requiring fast reflexes to destroy it. The cruiser, 200 points, can follow the player at incredible speed and is one of the most dangerous aliens. The 250-point bomber is simple to hit, while the pod is worth a full 1,000 points.

The pod, incidentally, has the nasty feature of breaking into six smaller aliens known as swarmers, which are 150 points each but very difficult to hit.

You can rescue a man captured by a lander. After destroying the lander, fly toward the man and bring him safely to the ground. Avoid bombs; they can easily be shot down but are worth nothing in point value.

Model III Graphics

The Model I version uses letters and symbols to indicate your ship and the different aliens. But the Model III version uses the special characters to the utmost. The special character graphics capabilities on the Model III are very appropriate and much more realistic. The man looks like a man rather than the letter "I."

The other Model III graphics are excellent. The moving mountains below the spaceship are very well done and change constantly. The laser fire from the ship is not a thick graphics line, but rather a line produced by the cursor character. This provides a smooth, straight, thin line for laser fire.

Sound is also a big plus. Never before have I heard so much sound utilized, and the variety of sounds within the program make it more exciting. The sounds have a very human tone.

Flight Controls

The controls are not easy to master. There are many controls to mind: the numbers one through three, the numbers eight through nine, and the Enter key and space bar. I found it easiest to manage by using my left hand on the regular keyboard numbers (1-3) and my right hand on the keypad numbers (8-9). From this position I can access both Enter and the space bar.

The 1 key changes direction. Keys 2 and 3 move the spaceship up and down respectively. The 8 applies thrust and 9 fires the laser. The space bar sets off one of three smart bombs (bombs that destroy everything on the screen except you). Enter is for hyperspace.

I highly recommend Alien Defense to Model I users and even more strongly to Model III owners. The fast action, exciting graphics and sometimes humorous sounds add up to a lot of fun.■

Defense Command
Big Five Software
P.O. Box 9078-185
Van Nuys, CA 91409
Model I or III
$19.95 disk
$15.95 cassette
by Tim Knight

Incredible graphics, sound and voices add up to fun in Defense Command, Big Five's latest contribution to the games market.

The game is in machine language and loads with the System command. It will work on the Model I and III computers, and comes on tape or disk. The programmers made sure that if the program is run on a Model III, it takes advantage of special characters. The Model I and Model III versions are identical and they both check for the model type to use the applicable features of either machine.

After loading the game, you are asked for one or two player games. To see the top scores press Clear.

A New Idea

The game is unlike any arcade game I have seen. The player is placed at the bottom of the screen, and is guarding highly important Krotnium fuel cells in the Kromforkrom galaxy. A whole slew of nasty aliens comes down and tries to steal the fuel cells from you.

You are transported to the area by a mother ship. Several other ships escort you down, including a flagship, which is worth a lot of points later on. After transporting down, you wait for the aliens to

MAILING LIST SYSTEM $89.95

For TRS-80 (Tandy Trade Mark) Model I and III

WHAT SETS OUR SYSTEM APART?...

- Our system is configured specifically for large mailing lists (or small) on **floppy disk drives**. Some other major systems run on floppies but are really intended for use on hard disk drives. Such a system assumes that you have vast amounts of on line disk storage capacity ..the continuity of the data is limited to what you can have on line at one time. To get the real benefit of such a system, one usually has to purchase expanded track/density floppy disk drives and even then the problem occurs when all the drives are filled with data. We have neatly solved this problem by allowing all your data disks to be maintained in continuous order...even though, due to the limitations of your drives, the list may be too large to all be "on line" at one time. Thus our system accomodates extremely large lists using your existing drives and yet avoides the "segmented" data problems of the hard disk approach.
- While it is fashionable to advertize all-machine-code systems, our system is primarily written in BASIC with embedded machine code for the speed sensitive areas. What this means is that our system is **easy** to **modify**, yet extremely fast. This is very important since many users like to have custom modifications made (either by them or us) so as to fit some unique requirement. Our manual has a section devoted exclusively to such modifications. Remember all-machine-code systems are extremely difficult to modify.
- Continuity of the ordered data (even data spanning many disks is not limited to a "session" as with some, but is permanent.
- Optional "backing up" of your data as-you-go is an integral part of the system and is not restriced to the end of a session. This is true even for deletions.
- The length of our data fields are more than adequate to accomodate even your longest names/addresses.
- Adjusts to a 32K memory although full use is made of a 48K memory. Can be used with virtually any DOS including TRSDOS.
- The program disk does not have to stay on line, thus freeing more space for data storage.
- Load and scroll through entire entries or selected fields. Edit as you scroll or go directly (takes about 2 sec.) to a specific entry and edit or delete.
- Our automatic repeat feature allows often used names/addresses to be entered with a single key stroke.
- Each disk entry optionally "remembers" how many mailings have been made for that particular entry. Can be tied in with purge/select.
- Continuing **expert** support just a phone call away. You will be able to discuss your problems/modifications with the authors.

ADDITIONAL FEATURES:

- Simple to use, even for the novice...menu oriented.
- Permits **2260** names "on-line" with 40 track double density drives and almost **5000** names with 80 track drives. The older 35 single density drives permit 1025 on-line entries...made possible with our unique data compression techniques.
- Super fast sort by alph or zip order (8 sec for 1000 entries). Both orders can exist **simultaneously** on disk.
- High speed of recovery of entries from disk...speed of sort is meaningless if retreival from disk is slow. Ours pulls in over 11 per sec!
- Master list printout of your list in several formats (not just a rehash of the labels)...extremely useful.
- Zip order is "sub-alphabetized".
- Less than 5 digit zips have leading 0's appended.
- Supports 9 digit zips, **Canadian zips**, and foreign abbreviations. All Zips are coded and stored as numbers to facilitate custom modifications.
- Optional reversal of names about commas. This permits disk storage in last-name-first order to facilitate meaningful ordering while the printout will be in "natural" order.
- Permits telephone, account, and/or serial numbers, etc.
- Prints on envelopes or labels 1, 2, 3, or 4 across.
- Test label/envelope printing allows you to make vertical and horizontal adjustments with ease.
- Transfers old files over to our system ← **LOOK**
- Selective printout by specific zips or zip ranges.
- Plenty of user defined fields with provisions for simultaneously purging and/or selecting the printout...even allows for inequalities...Powerful and easy to use.
- Editing is simple and fast...direct access or automatic search. Batch transfer of edited entries to backup disks.
- Optionally provides for duplicate labels.
- Deleted entries have "holes" on disk filled automatically and alph order is still maintained!
- All labels optionally support an "Attn." line with provisions for multiple entries. This permits mail to be sent to several people at given addresses.
- All Ø's in address labels are replaced by easier to read 0's.
- Continuous display of number of labels/envelopes printed.
- Extensive use of error traps (both operator and machine induced) even recovers from a printout during a power failure.
- Extensive documentation manual.
- Hardware requirements: 32K, printer, and 1 or 2 drives.

FORM LETTER (Use alone or with Mail List System above) $39.95

Create letters and store on disk with provisions for later retrieval and additions. Then print your letters using your mailing list.

- Same select and purge features as mailing list system.
- Select either continuous fanfold or "cut sheet" paper.
- Selectable tabing, test printing, and paging.
- Allows regular or legal size pages.
- Greetings are selectable by codes on mailing list. Options include Mr./Mrs., First/Last Name, global, or user defined.

Supercalendar (tape)	**$19.95**	Loan Amortization (tape)	**$29.95**
Football Scout (disk)	**$89.95**	Fash Sort & Alphabetizes	**$29.95**

Mailing List System	☐	Loan Amortization	☐	Supercalendar	☐
Form Letter	☐	Fash Sort & Alph	☐	Football Scout	☐
Model I	☐			Model III	☐

Total (Add $2.00 for Shipping & Handling) $ _____

Check ☐ COD ☐ Visa ☐ MC ☐

Card No. _____ /Exp _____

Name _____

Address _____

City, State, & Zip _____

PRECISION PROTOTYPES

410 E. Roca Refugio, TX 78377 (512)526-4753

See List of Advertisers on page 338

come, or you take a couple of shots at the aliens who escorted you. If you accidentally hit the mother ship, it sends down solar-energy crushers, which will inevitably smash you.

Once the aliens start coming down, you must dodge around trying to shoot them. If you accidentally run into one, they'll destroy one of your three ships. The aliens look similar to those of previous Big Five games, though there is an interesting one that pulsates like the aliens in Midway's Space Invaders, part II.

In addition to the regular aliens, a dangerous slicer will fly down, ignore you, and slice up your fuel canisters. You must kill the slicer before it gets to the bottom of the screen, or you lose.

The Controls

The game controls are standard. Use the arrow keys to move back and forth, and the space bar to fire. There are some substitute combinations of keys, but those mentioned are the most popular. You can also use a joystick.

Besides shooting the aliens, you have another defense against them: the anti-matter bombs. Any number key (0-9) destroys every alien on the screen. This is great, but you have only four anti-matter bombs. You receive an additional bomb with every 5,000 points, and an extra ship for every 10,000 points.

If all your ships are destroyed, the game ends. If you're foolish enough to let your fuel canisters be taken, the mother ship sends down those solar-energy crushers to flatten you.

You Can't Win

There is no way to win, but if you get a high score, an amazing graphic Great Score appears. Every letter of the words Great Score is like the Fourth of July.

One of this game's most impressive features is the voice. The voices are clear and loud and are far superior to the old Robot Attack game. They even change pitches (both squeaky and low voices) and are present during different points of the game.

The other sounds and the graphics—lasers, explosions, and blips—come through your computer's amplifier. The graphics are smooth and fast and offer exciting times for players of Defense Command.

Defense Command is a superb game and an an orginal idea. The sounds, graphics, and voices are excellent. Instead of being an imitation of some other arcade game, it is new and a great deal of fun. ■

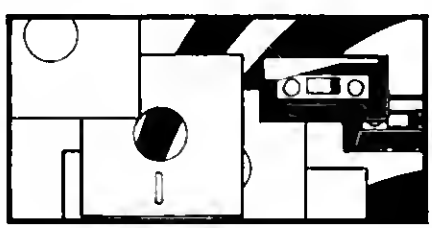
Interactive Fiction:
Two Heads of the Coin
Local Call for Death
On Her Majesty's Ship Impetuous
Dragons of Hong Kong
R. Lafore
Adventure International
Box 3435
Longwood, FL 32750
Model III, 32K
$29.95 disk

by John P. Mello Jr.
80 Micro staff

Who wouldn't jump at the chance to be a famous detective prowling through London high society at the turn of the century attempting to solve a devilish murder? Or command a 64-gun ship-of-the-line through hostile waters during Napoleonic wars? Or how about be a hard-nosed gumshoe hot on the trail of a modern-day scourge of mankind? And if one of those roles weren't enough, how about being a novelist, too? That's the promise of Adventure International's Interactive Fiction series. However, as is often the case in a would-be Walter Mitty's world, a shadow frequently falls betwixt the delivery and the vow.

Interactive Fiction presents a person with the framework of a genre novel and lets him be a character in the book. (If you're a woman, forget it. The programmer's warning in "The Dragons of Hong Kong" applies to the entire series: "This story has a rather male perspective. We suggest you adopt a male outlook and a man's name.") As the plot thickens, you write your own dialog and make decisions influencing the outcome of the story. In the first two offerings—"Local Call for Death" and "Two Heads of a Coin"—there is only one outcome: solving the mystery at hand. In "His Majesty's Ship Impetuous" and "The Dragons of Hong Kong" there are at least three possible endings.

"Local Call" takes place "a few years after the Great War." You are called on to assume the role of a reputed American detective in England rubbing shoulders with the crust of London society. Programmer R. Lafore offers some nice touches of high living here: You dine on Filet De Boeuf Strassbourgeoise, drink



1913 Chateau Doigt de Pied, and tool through the city on the Thames in a Hispano-Suiza, one of the finest automobiles ever made.

Although the plot of "Local Call" is engaging (an apparent suicide tickles your deductive instincts), in many cases characters fail to interact with you. On several runs of the novel, when financier Major Wormsley asked Alec Deepgrave (this reviewer's persona) his occupation, responses such as a brain surgeon, injection mold engineer, grave robber and gigolo triggered the same response from the major: "Oh, I see."

A more subtle device used by Lafore is to force a user's protagonist into a "yes" or "no" response. When Deepgrave was asked if he'd like more wine after finishing dinner, he replied yes, only to be upbraided for hitting the sauce heavily. When he replied no on another occasion, he was chastised for being a prohibitionist. His dinner companions found unintelligible a response without a yes or no in it, such as, "I'd rather have a Between the Sheets."

When interaction becomes more complicated in "Local Call," the give and take between characters can become nonsensical. At one point, Deepgrave accuses one of the suspects of being a murderer based on a handwriting sample the American detective has in his possession. The murderer's reaction: "If you think I'm going to write something for you after your libelous (sic) insinuations, then think again."

On the procedural level, the documentation for converting "Local Call" to Model III format was fine until it explained building the "DO" files. The docs left out a reminder to take the Model I version of the game out of drive one before you create the files; otherwise, you will get a CRC error.

In the second "novel" in the series, "Two Heads of a Coin," James Conway, a middle-aged, well-groomed, prosperous businessman, enlists the help of a Sherlock Holmes-style detective to find his missing wife Georgina. However, Two Heads also proves to be irresponsive. Not only does it serve up the old reliable "I don't understand your meaning," but sometimes resembles the proverbial broken record. Here Conway is questioned by

detective Basil Trufflehound:

T: Did you ask her mother if Georgina paid her an unexpected visit?

C: Georgina spends every Friday night at her mother's. She's done it for years. Really, I admire her sense of duty.

T: Did Georgina visit her mother the Tuesday she disappeared?

T: Georgina spends every Friday night at her mother's...

Two Head's irresponsiveness eventually provided the clue that helped Trufflehound crack the Conway case:

T: Why were Georgina's friends scandalized by her disappearance?

C: Georgina doesn't know that Chantelle even exists as far as I know.

Up to that point, there had been no mention of the voluptuous Chantelle. Why Conway volunteered the information in response to Trufflehound's question was the real mystery in this "novel."

Both Local Call and Two Heads have a drawback inherent in their genre. Once you solve them, there isn't much point in reading them again. But that's less of a drawback for a $3 mystery than a piece of software. (Adventure International may be aware of this. A spokesperson said the firm will release in June all the adventures and a short story, "Encounter in the Park," in one $29.95 package.)

"On His Majesty's Ship Impetuous" and "The Dragons of Hong Kong" are more ambitious and challenging than their predecessors.

In HMS Impetuous, not only must you pilot a ship-of-the-line through enemy-infested waters, but command a temperamental crew. Your troubles begin when a junior officer affronts your authority. How you handle this situation seems to determine the outcome of the novel because it has a profound affect on the behavior of your crew.

Although Impetuous doesn't appear as irresponsive as the earlier games, it can frustrate you at times. Take this exchange between the protagonist, Captain Captain, and the insubordinate Lt. Fallow:

C: I've decided to let you stay here on the island, Fallow, as punishment for your insubordination. If you're lucky, you'll be found by the French.

F: That's too complicated, sir. You have to hang me, pardon me, or...

C: All right Fallow. I'm going to leave you.

F: I'm sorry, sir, I don't understand. Are you going to hang me or perdon me?

C: I'm going to do neither.

F: I'm sorry, sir, I don't understand. Are you going to hang me or perdon me?

C: I'm going to demote you.

F: I'm sorry, sir, I don't understand. Are you going to hang me or pardon me?

Captain Captain became so frustrated he hung Fallow.

Lafore warns interactive novelists to "play it straight" to get the most fun out of the software, but outrageous behavior can yield some entertaining results in the face of the program's boilerplate ambience. Take this exchange between Admiral Wormwood and Captain Captain:

"So, Captain Captain, your little 'Impetuous' has done very well." The Admiral favored Captain with a supercilious smile.

Captain wondered what was coming next. "Up your nose."

"You will address me as 'sir,' Captain. A serious breach of etiquette, but I will overlook it this once."

Although Impetuous has several endings and you influence them with your decisions, it seems you will always make it to the final chapter where your ship-of-the-line confronts an enemy armada of 40 ships, most of them superior in firepower to yours. You can't cleanse every sin you've committed to that point, but you will always salvage a measure of glory if you exhibit a stout heart.

That isn't the case in the "Dragons of Hong Kong." It is as Byzantine as a good adventure game full of traps and dead ends. If you're really lily livered, you may even end up as an accountant and nothing of interest ever happens to you for the rest of your life. Unlike its predecessors, Dragons makes you feel you're interacting with something more than a thinly disguised adventure game—not only that you're interacting but also creating.

In Dragons, Lafore's prose walks the line between spoof and parody giving the "novel" the flavor of the hardest boiled fiction:

"Not even a real estate agent would claim Big Al's Bar had a prestigious location. An iron mill crowds up on one side, and on the other is the kind of transient hotel guests tend to leave feet first.

"You cross a railroad siding and push open Big Al's door. The welterweight match on the tv is making a nice counterpoint with the jukebox blaring 'Born to be a Redneck,' and the smell of stale beer probably couldn't be cut with hand tools."

Dragons and its predecessors don't quite live up to the hype Adventure International advances in their cause: "Lafore has succeeded in eliminating the static structuring often found in entertainment programs in favor of a refreshing format which allows the player total involvement within inventive fictional situations." Even Lafore, quoted in *Omni* admits that. "The interactivity in these stories is now somewhat limited," he said. But as Dragons indicates, the series is in evolution and getting better all the time.■

MICRO IMAGES
★ ★ FREE SHIPPING ★ ★
WITHIN CONTINENTAL U.S.A.

LAZYWRITER
Latest Version Model I/III $159.95

SUPERSCRIPT BY ACORN $44.95
Req. 32K, Scripsit & L/C Disk

DOSPLUS 3.4 $129.95
Specify 3.4S/3.4D/or 3.4III

LDOS 5.1 — Mod I or III $118.95

Mod I/III **LYNX** $249.95
auto dial/answer, cables and software

UNITERM by Pete Roberts Mod I/III $74.95

VERBATIM Box of 10 $30.00
Datalife 5¼ MD525-01 - Inq. Qty Discount

EDITOR ASSEMBLER PLUS
BY Microsoft -Mdl I Tape $27.95 - Disk $45.95

MORE MAXI'S
MAXI MANAGER Mod I/III $79.95
MAXI UTILITY $44.95
MAXI CRAS Mod I/III $84.95
MAXI MAIL Mod III $84.95
MAXI STAT Mod I/III $179.95

Proofreader by Aspen... Mod I-III - 54.95
Proofedit by Aspen..... Mod I - III - 28.50
Grammatik by Aspen... Mod I - III - 54.95
SPECIAL...ALL 3 FOR ONLY $130.00

EDAS by Misosys Mdl I/III $69.95

SUPER UTILITY PLUS 2.2 $46.95
Mdl I/III specify 40 or 80 track

Ribbon Reloads
$3.50 each — $38.00 Dz. (Min. 5)
Available for MX 70/80/100

ICL by XYZT *MDL I or III* $37.95
MICROSOFT - Fortran 80 - $89.95
ALDS - $89.95 — Basic Compiler - $179.95

PRINTER STANDS
Plexiglass 3/16 × 11.8 × 13.5 × 3.3
Clear - $13.50 Bronze - $15.95
Space Age Stand. Holds your printer at an angle which allows the user to easily view the printing. 3/16 × 9.3 × 13.5 × 8
Clear - $27.50 Bronze - 29.95

GAMES

	TAPE	DISK
Eliminator	18.45	22.45
Starfighter	22.45	27.95
Armored Patrol	18.45	22.95
Sky Warrior	13.95	19.45
Stone of Sisyphus		27.95
Earthquake S.F. 1906	18.45	19.45
Crush Crumble Chomp	27.95	27.95
Voyage of Valkyrie	32.95	35.95
Forbidden Planet		35.95
Forbidden City		35.95
Any Big 5 Program	14.95	18.45
Scarfman	14.95	18.45

We also carry the full line of ADVENTURE INT'L ACORN BIG FIVE BRODERBRUND AVALON HILL MICROSOFT MISOSYS AUTOMATED SIMULATIONS and most other line soft ware at discount prices

SEND FOR YOUR FREE CATALOG
No credit cards at these low prices. Add $2.00 on all cod orders. Certified CK/MO COD shipped immediately. Please allow 2 weeks for personal checks. For extra fast service phone in your COD order. Prices subject to change without notice. New York State residents please add appropriate sales tax.
We Offer Great Values & Prompt Delivery — Try Us!

146-03 25th Road ✓ 157
Flushing, New York 11354
Mon-Fri 10 A.M.-9 P.M. **(212) 445-7124** Sat. 10 A.M.-5 P.M.

✓ See List of Advertisers on page 338

Head Cleaning Diskettes

Not yet available for Vydec, Burroughs Mini-Disk II, or 96 TPI drives

Keep your diskette drive heads "Computer Room Clean" with Scotch® Head Cleaning Diskettes. You can clean the heads yourself in just 30 seconds and save on service calls, data drop-outs, costly down time. Available in 8-inch and 5¼-inch sizes.

$24.00

Amflex Products & Services

WORD AND DATA PROCESSING PRODUCTS

P.O. Box 852, Adrian, MI 49221

Telephone: 517-423-7112

423

DURABILITY EXCELLENCE

NO ACCIDENT WITH SCOTCH DISKETTES FROM MEDIA TECH

Top quality at a low price of 2.55* ea.

Full line of 3M computer supplies, stock paper and labels available

*5¼" single side, single density in quantity of 50 +. Packaged 10/ctn.

ORDER TOLL-FREE 1-800-248-0282

VISA MasterCard

MEDIA TECH ASSOC. INC.

405

(517) 676-4205 P.O. BOX 27271

LANSING, MICHIGAN 48909

Authorized Distributor Information Processing Products 3M

80 REVIEWS

Super Micro Pro Football
Micro Pro Systems
Route #2, Box 533
Cumming, GA 30130
Models I & III
$19.95 32K disk
$22.95 48K disk

by Mark E. Renne

What would the ultimate football game for computer play contain? Perhaps it would be a 48K game which fills a disk with program modules and loads each at certain times. How about an opponent with four skill levels? Graphic cartoons would break up dull times now and then. It would be filled with cute comments about stadium fans and tv cameras. It might even play a darn good game of football. The Super Micro Pro Football is all this and more.

The game starts with nine pages (screens) of instructions. Instructions are complete and easy to understand. The game uses over 100 random number generators so you can expect the unexpected. The computer reviews your strategy and nails you to the wall if you use only a few plays. Quarters range from 5-15 minutes long and you may chose whether or not to use the play timer. The screen shows a standard football field and indicates ball location with a pair of parentheses. The screen also shows score, direction of travel, time remaining, quarter, play timer, down and ball location.

Complete statistics appear whenever you call a time out or at the end of the game. They include passing, scoring, fumbles, rushing and all other standard stats. Momentum even comes into play when things are going right to give you that extra edge. You may play one of four different teams ranging from good to very tough. After you enter your team name and skill level the computer creates a file with this information and remembers it from then on.

There are 18 offensive and 8 defensive players. Offensive plays include: quarterback sneak, fake pass/quarterback rollout, center plunge, draw play, sweep right, sweep left, drive through guard and tackle, halfback option, reverse right, reverse left, screen pass, the bomb, long pass, short pass, time out, punt and field goal attempt.

Defensive plays include: rushing, passing, general purpose, pass blitz, right-side rushing, left-side rushing, punt and field goal defenses. The correct defense will not always stop the offense, just like real life, but the chances are good. Gains may be 99 yards on kick-off returns, interceptions, or punt returns. You have 10 seconds to enter a defensive play and 30 seconds to enter an offensive play. If you wait too long on defense the computer uses a general purpose defense. On offense you will either fumble the ball or receive a delay-of-game penalty if you wait too long.

The game also has graphic cartoons for the coin toss, field goals, kick-offs, injuries, scoreboard and even a message from the opposing quarterback. There is a graphic half-time show and a streaker. (Sorry, no graphics.)

Anything can go wrong. You can have a bad pass from center, run the wrong way, have the defense beat the ball downfield, have an illegal procedure called or even have pass interference. Kick-offs may be standard or onside. Safetys are possible as well as sudden death if the score is tied.

To play the game, you enter your play number or letter and the computer takes over. The game narrative is very fun and always full of surprises. You never know when a player may get crunched or when someone might throw Howard Cosell on the field. It is fun to throw the bomb on the first down just to confuse the other guy (the computer). The game plays extremely well and is error free. All the football options are here as well as all the problems. If you have a 48K machine and enjoy football, you will enjoy this game.■

The Eliminator
Wayne Westmorelend & Terry Gilman
Adventure Internetional
Box 3435
Longwood, FL 32750
18K Model I or III tape $19.95
32K Model I or III disk $24.95

by Mark E. Renne

You are the pilot of the starcraft Eliminator. The controls of your ship are simple to learn, but difficult to master; to defeat the enemy, you must have split-second control of your ship.

The arrow keys are used for forward, reverse, up and down. Firing a plasma burst requires pressing the space bar, and a tap of the Clear key throws you into hyperspace. Hyperspace transports you to another part of the planet. Your last option is a disruptor charge, which destroys everything on the screen except your men and yourself. Since this is such a powerful weapon you have only three charges.

Your goal is to keep the aliens from cap-

A Computer That Writes Programs For You.

What will they think of next..?

Your computer is fantastically fast...once it knows what to do. You probably realize that a computer is really the combination of hardware and software, working together smoothly, to give you what you want. Either one alone is useless. Software is really the key...the "mind" of a computer system. Every project or task you want to do requires a new specific software application to make it behave exactly the way you desire.

Of course, you may be able to "force-fit" an application into some existing canned program you have, but to really get results, you need a separate application program to run on your computer.

Until now, that meant you were forced to pay money for application software off the shelf, or if you could afford it, have it custom written for you, or, if you are qualified, do it yourself...spending endless hours figuring it out and writing it. Now, your computer can write individual application programs for you. These programs are each separate, unique software programs that run in standard Basic on your computer.

A company named FutureSoft has developed this exciting and long awaited remarkable working tool for you. There are two versions called *Quikpro+Plus* and standard *Quikpro*. Both of them create unique separate Basic programs for you...to do exactly, precisely, what you want to do. And listen to this...you create a new program in minutes instead of hours.

You can quickly generate a new program when you want it. You can generate thousands of different unique programs, each one standing alone as a complete program that runs in Basic. Best of all, you do not have to be a programmer to do it. The *Quikpro* software becomes your personal programmer, waiting to do your work for you any time of day or night you choose to use it.

The custom programs you generate from this software provide for: Data Entry, Additions, Changes, Record Locating & Searches, great variety of Computations, and Report Printing (if you have a printer). It lets you decide what data to manipulate and how to manipulate it. It lets you decide the formats you want to appear on your screen and/or to print out in a report. It lets you use differing formats on the same data base. It lets you make calculations from data within records without altering the data base. It lets you report results with or without including the base data from which results were calculated.

All this is included in the ability/power of the program you create. You do it by simply answering questions that appear on your screen. Instantly, the *Quikpro* software instructs the computer to perform complex and error free instructional sequences. You get the immediate benefits of professionally written software for your application

The resulting custom program is truly a separate Basic program. You can list it, you can modify it, you can actually see what makes it tick. You can even ask it to print out its own operating instruction manual so others can run it for you. Finally, you can really tap the speed and power of your computer the way you really want. You can create new programs for every use you have in Business, Science, Education, and Hobby areas. And you can start now

The software is available immediately from the creators. It comes in two versions. If you want to generate separate Basic programs with all the data handling plus Calculations and Report Printing features, you want *Quikpro+Plus*. Specify to run on TRS80 Model I and Model III at only $149; to run on TRS80 Model II at $189.

If you do not need Calculation ability or Report Printing in the separate Basic programs you will create from this program generating software, then standard *Quikpro* will do the job for you. Standard *Quikpro* to run on TRS80 Model I or Model III is $89; to run on TRS80 Model II is $129 (Later on you can always trade up to the Plus Versions for only the cost difference between the two).

Both programs are available to run on many other computers besides TRS80. Details are available by calling or writing

You can order right now by phone or mail. If you have Visa/Mastercard, call toll-free from:

All States except CA-AL-HI	1-800-824-7888 OP# 441
From California call	1-800-852-7777 Op# 441
From Alaska/Hawaii call	1-800-824-7919 Op# 441

Operators on duty 24 hours daily. Operators can not answer technical questions. If you need technical information or want to order from Canada or other nations, call 1-904-269-1918 during office hours, Eastern Time, Mon.-Fri.

Send mail orders with check, money order or credit card information to: FutureSoft, P.O. Box 1446-D, Orange Park , Florida 32073. FutureSoft gives you a satisfaction or your money refunded guarantee for 10 days from delivery. You can run the software yourself on your own computer and see with your own eyes what it can do for you. Order now. ↙66

↙See List of Advertisers on page 338

turing your energizers and taking them to the top of the screen. The energizers are placed on gantry towers throughout the planet. If you destroy the first wave, another wave appears after you receive bonus points for remaining energizers. There is no end to the villains until you lose all your ships or all the energizers are captured.

The enemy comes in assorted degrees of difficulty. Disruptoids are the most common and the easiest to destroy; they score 150 points. Disruptoids hover around the energizers waiting for a chance to kidnap them. I think their favorite trick is to put an energizer between you and them. This means you run the chance of destroying the energizer yourself and saving them considerable risk. If a disruptoid makes it to the top of the screen he moves much faster and is more difficult to destroy.

The second type of alien is a drone; although they don't fire at you, their purpose is to plant aerial mines. If you hit a mine, your ship is destroyed. They score 250 points. The final enemy is a tracer dispersel unit, or TDU. They are harmless to your ship and score 1,000 points. After being touched, five tracers are released; each tracer is worth 150 points. These tracers follow you and each one packs a deadly force. With practice, you can score extra points by destroying a disruptoid carrying an energizer. Normally energizers fall back to the gantries, scoring 250 points if they are dropped from no further than halfway up the screen. (Any further and they are destroyed when they land.) By intercepting a falling energizer you score 500 points; placing it on an open gantry scores an additional 500 points.

One or two players may play. If you are one of the top 10 scores, you can enter it along with your name. The disk version permanently stores the information. Screen information includes score, ships, and bombs remaining, and current record high score. At the top of the screen is a long range scanner that covers the entire planet. It indicates the location of the aliens and if any energizers are being picked up. Sound is available through the cassette AUX plug. The game aborts by pressing shift and break. Pressing the S and shift keys freezes the display until the enter key continues the fight.

To score points, manipulate the controls as if they were an extension of your hand. It's imperative to eliminate the first wave without using any disruptor charges. You need them more during the later waves. By saving the tracer dispersal units (TDU) for last, you can eliminate the tracers with greater ease. Rapid fire is not advised; you usually end up destroying as many energizers as aliens. Once a disruptoid gets to the top of the screen, he will try to come from behind. By keeping him in front, you have a much better chance of destroying him.

The game instructions are clear and include loading instructions for all computers.

Eliminator is fast, challenging, and saves enough quarters in a month to pay for itself. Graphics and sound are superb, just as advertised. Eliminator is one of the first arcade games to come from Adventure International and certainly not the last.■

Search and Sort
Micro Pro Systems
RT. 2 Bow 533
Cumming, GA 30130
Models I and III
$11.95 cassette
$13.95 disk

by Joel Benjamin

Search and Sort is a set of machine-language modules that can easily be called from a Basic program. They perform several related tasks essential in any program handling data files.

Search and Sort provided the ability to search through sorted lists of strings for a specific string. If the target string is found, the program returns a value corresponding to the string's position. If it is not found, you have the option of inserting it in its proper place. You can also sort a string or numeric array in ascending or descending order.

A search of an ordered array of 1,000 strings takes about one second. Once the correct position is found, the insert takes less than a second. A random list of 1,000 strings, each about eight characters long, takes about three seconds. It sorts an array of 1,000 random integers in about three seconds and 1,000 single or double-precision numbers in four to six seconds.

The documentation briefly describes how routines are called from Basic through the USR function and then refers you to the sample Basic program that is provided on tape or disk. Demonstration programs are all too often omitted from utility packages where their inclusion could save hours of needless trial and error.

I do have a few reservations about Search and Sort's sample program. Since there is no listing of the program supplied, if you don't have a printer, you must decipher it from the screen. This can be a tedious chore because the code is not formatted to be easily read. For one thing, it does not utilize that powerful aid to both vision and understanding—*indentation*. This would have helped to easily distinguish the code that accesses machine-language subroutines from the code that generates the random numbers and strings. The author also didn't include blank remark lines, which would have helped to block off program modules.

Although the sample program demonstrates how to access the search and sort routines, I don't feel it should be used as a substitute for amply written documentation. It would have been helpful to have included a simple application or two.

Search and Sort is an excellent utility package which can be used very profitably by both advanced and, with a bit of struggling, beginning programmers. I recommend it.■

Mind Thrust
Hayden
50 Essex St.
Rochelle Park, NJ 07662
Model I Level II, 16K
$16.95

by Eric Maloney
***80 Micro* staff**

Here at the office, the first reaction to Mind Thrust was, "Too simple. What's the point?"

Well, a nice simple program sounded fine to me. I had just finished wrestling with a behemoth of a space epic which, between its convoluted playing procedures and its dismal documentation, had me spitting blood at self-indulgent programmers who write Chinese puzzles that a troop of drug-frenzied Tibetan lamas on roller skates would not be able to figure out. Why do so many game programs look like they were salvaged from Rube Goldberg's wastebasket? What's wrong with the modest elegance of traditional games like chess, checkers, Scrabble and 500 rummy?

So I was prepared to enjoy Mind Thrust. And I did—for about 15 minutes. Mind

Thrust is simple, all right. Unfortunately, it is also simplistic.

Mind Thrust reminds you vaguely of Othello. You are given a 6 by 8 grid on which you and the computer each place five pieces. Then, taking turns placing pieces, you each try to form a chain from end to end, or eliminate each other's pieces by attacking.

You can attack any piece touching one of yours. But the computer can defend some of its pieces. If you have a choice of five pieces to attack, the computer can defend three. If you attack a piece it chooses not to defend, it loses the piece. If the computer defends successfully, you lose your piece, all those adjacent to it and any left isolated. The computer, naturally, can also attack.

Hayden bills Mind Thrust as a game that "combines stretegic skill and luck." Put the emphasis on luck.

First, the computer does not think strategically. Its opening moves are random. In some cases you can form a chain and win unchallenged. Also, the computer has no idea when to attack; it will plod along trying to form a chain when attack is its only hope of winning.

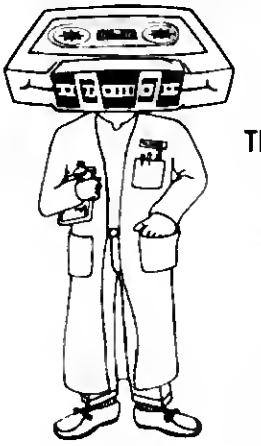
"...the computer... will plod along trying to form a chain when attack is its only hope of winning."

Second, when you attack, your choice of which piece to go after is strictly a matter of guesswork. The computer uses no strategy when it defends.

Finally, you cannot develop any logical plan of defense. The computer randomly decides which of your pieces it will attack; you must randomly decide which ones to protect.

The game is not a bad idea and could be fairly entertaining if the computer were programmed with some more smarts. But as it is now, Mind Thrust falls somewhere between being a game of chance and a game of strategy, providing the satisfactions of neither. It offers about one thrill every hour, if you can sit still that long. ■

Sick of the same TRS-80 software?



Here's a CHEAP CURE!

The prescription for the **Model I and III:**
CLOAD Magazine!

A CASSETTE TAPE with 6 to 8 programs **a month!**

Some past sensational medications

Game — Caterpillar, Suns, CIA Adventure, Reversi
Practical — Securities, Energy, Tape Directory, Checkbook
Utility — Variable Dump, Display, Edit, Code It
Tutorial — Planets, Spell Egg, Atomic Table, Geometry

At about **75 cents** a program, a subscription to **CLOAD Megazine** is just what the doctor ordered.

The Bottom Line:

1 year (12 issues)	$50.00
6 months (6 issues)	$30.00
Single copies	
Back issues	$ 6.00
Good Games #1	$12.00
Adventures #1	$13.00

California residents add 6% to single copies
North America — First Class Postage Included
Overseas — add $10 to subscriptions, and $1 to single copies. Sent AO rate

The Fine Print
All issues from Oct '78 on available — ask for list (24 Level I issues also)
Programs are for 16K Level II, 16K Model III, and occasionally for disks
TRS-80 is a trademark of Tandy Corp.

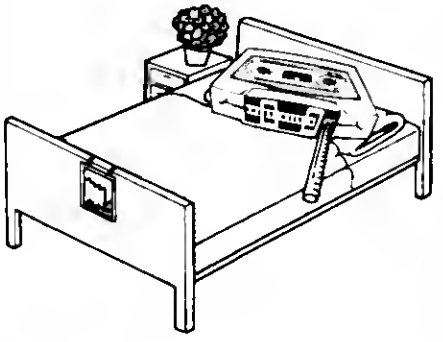
MasterCard/Visa welcome!

CLOAD Magazine Inc.
P.O. Box 1448, Santa Barbara, CA 93102 (805) 962-6271

102

For the Extended BASIC COLOR COMPUTER

POCKETBOOK SURGERY NOT REQUIRED



Is your CoCo table ridden, drinking up electrical juice but not getting any software solids? A prescription of **CHROMASETTE** Magazine will stop the hardening of the ribbon cables.

The doctor explained that **CHROMASETTE** Magazine is a cassette tape with 6 to 8 quality programs on it. A healthy mixture of games, tutorials, utilities, and practical programs to nurture your computer every month. No finger exercises necessary. Just load and run.

Keep CoCo's health costs low. A subscription to **CHROMASETTE** Magazine is good, cheap medication (under 75 cents a program).

The Bottom Line:

1 year (12 issues)	$45.00
6 months (6 issues)	$25.00
Single copies	$ 5.00

Calif. residents add 6% to single copies
North America — First Class Postage Included
Overseas — add $10 to subscriptions, and $1 to single copies. Sent AO rate

MasterCard/Visa welcome!

The Fine Print:
All issues from July 81 on available — ask for list. Programs are for the Extended BASIC model only.

MasterCard/Visa welcome!

Chromasette Magazine
P.O. Box 1087 Santa Barbara, CA 93102 (805) 963-1066

103

See List of Advertisers on page 338

We've grown on you

With Acorn Programs, Your TRS–80 Does Things You Wouldn't Think Possible

Our sophisticated programs make sight and sound seem simultaneous—you're never disappointed when you select a program from us. ***And,*** our customer service is unparalleled in excellence.

Acorn Has a Program For Everyone

Whether you want games, adventure programs, word processing enhancement programs, teaching programs, utility programs that help serious programmers improve their programming and get more out of their computers . . . Acorn has them all.

SuperScript

By Richard Wilkes

An enhancement program to Radio Shack's Scripsit, SuperScript turns a good word processing system into a great one! Depending on your printer's capabilities, you can superscript, subscript, underline, boldface, select 10/12 pitch and slash zeroes. Brackets, braces and carets can now be entered from the keyboard. You can get a Directory and Kill files within SuperScript without losing text. You can pause while printing and insert text into unjustified lines. Eleven drivers are included with SuperScript—one of which should work with almost any type of printer. However, not *all* features are available on all drivers . . . and not all features are possible on all printers. Serial drivers are provided which use the ETX/ACK protocol for 1200 baud communications. Special drivers are provided for the NEC 5510, Nec 5530, Daisy Wheel II, Lineprinter IV (Centronics 737), Diablo printer, and Epson MX80 (Graftrax owners can get underlining and italics). Custom serial and parallel drivers are included which can be modified to provide some or all features on most standard printers. Both Model I and Model III versions require Model I Scripsit. Model III owners use the Model III TRSDOS "CONVERT" utility. SuperScript is designed to work with TRSDOS. SuperScript may work to some extent with other systems—but not all features may be available. Model III version will run under LDOS. For more information, write Acorn for a Fact Sheet.

32K Disk **$50.00**

plus $2.00 shipping and handling

TRS-80 & Scripsit are Registered Trademarks of Tandy Corp. Atari is a Registered Trademark of Warner Communications. IBM is a Registered Trademark of International Business Machines.

System Savers

By Tom Stibolt

Two machine language utility programs designed to make your use of SYSTEM format tapes easier and more enjoyable—you can make backup copies of ***standard*** SYSTEM tapes on ***either*** tape or disk. System Savers has two different programs on the cassette: FLEXL and TDISK.

FLEXL lets you merge two or more SYSTEM tapes into a single tape, merging machine language routines into one file. On the Model III, baud rates can be changed, allowing low baud rate tapes to be re-written to take advantage of the Model III's high baud rate. FLEXL enables the user to make and verify backup copies of programs written in the TRS-80 SYSTEM format.

TDISK allows the user to save programs from SYSTEM format tapes onto disk. It's specifically designed to allow saving and running disk programs that reside in the same location as TRSDOS. TDISK will automatically load programs with non-contiguous blocks.

16K Tape (transferable to disk)
TRS-80 Model I & III **$19.95**

plus $2.00 shipping and handling

NEW!

Instant Sort/Search Database

By Gordon Hatton

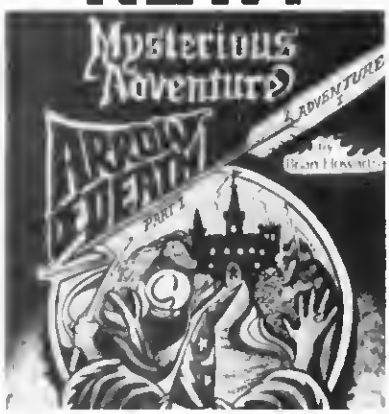
An easy-to-use fast information manager for home, personal or small business use. Even a novice can make full use of this program and it's extremely "user-friendly" in helping minimize operator errors. ISS comes in 3 parts: (1) lets you create, examine and save your custom-formatted data base; (2) sorts and searches the data base so you can pick out and print just the information you need; (3) provides powerful editing commands so you can modify and update your existing data files. ISS handles both alphabetic and numerical date.

16K Tape
or 32K Disk.
TRS-80 I & III **$49.95**

plus $2.00 shipping and handling

Because Our Programs Deliver What They Promise.

NEW!



Your Mysterious Adventures Begin With Arrow of Death, Part I.

By Brian Howarth

Acorn searched the world until we found a SUPERIOR Adventure Series in MACHINE LANGUAGE. We discovered this exciting new series in England—and because the author uses "proper English," you'll find the entire series a new mental challenge.

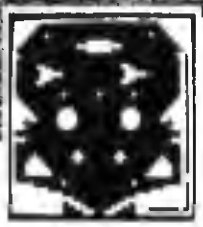
Arrow of Death, Part I is the first in this brand new Mysterious Adventure Series with all the popular features of TRS-80 Adventures but even more challenging.

In Arrow of Death, Part I, a mysterious blight has fallen on your land. It seems to come from the Golden Baton, once good but now a source of evil incarnate. Rain has destroyed the crops, friends are at each other's throats, depair and hatred fill the hearts of the people. The King implores you to aid his sorcerer, Zardra, in banishing this evil from the land. You agree, and the adventure begins. You'll face constant danger, possibly death—but you'll also have the opportunity to perform heroic tasks.

All Mysterious Adventures have a "save the game" feature. Arrow of Death, Part I is complete in itself...but we think you'll find it so challenging, you'll want to continue with Part II.

16K Tape
or 32K Disk. **$19.95**
TRS-80 I & III

plus $2.00 shipping and handling



Astroball

By John Allen

A REAL-TIME, MACHINE-LANGUAGE pinball arcade game with e space dimension—more sound and graphics than you'd think possible on your TRS-80! Astroball contains many moving targets with space ships, pulsars and Black Holes that can swallow your ball if you're not careful! The longer you hold down the space bar, the more force the ball has when it's launched...and the ball is even faster than in the amazing Pinball game! There are meteors to explode and space ships to hit. Pulsars may or may not be lit—if they're not lit when your ball goes into a Black Hole, you'll never see that ball again. 5 skill levels. Bonus points, extra balls available.

16K Tape
or Disk **$19.95**
TRS-80 I (Level II) or III.

plus $2.00 shipping and handling

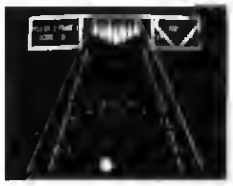
Space Rocks

By Steve Kearns

The best MACHINE LANGUAGE game of this type with a *unique time bomb feature.* Using your space ships, you shoot to break up the asteroids before they get you *and* you must also destroy time bombs before they detonate and destroy everything on the screen! Starting with 3 ships (you get another one every 10,000 points), you get only 4 shots at one time. Time bombs appear at random on your screen—there's a number in the middle of each bomb that counts down—when it reaches 0 it explodes! 9 game options for increasing difficulty. "Space Battle" option also available to eliminate space rocks so you can practice control of your ship.

16K Tape
or Disk **$19.95**
TRS-80 I (Level II) or III.

plus $2.00 shipping and handling



Tenpins

By John Allen

A fun-to-play bowling game for 1-4 players from John Allen with his usual emphasis on great grephics. Written in MACHINE LANGUAGE with sound effects. Just like a regulation bowling alley, there are marks ⅓ way down the lane. Sophisticated features include the ability to place spin on the ball with an errow key before the ball gets to these marks...and control of the speed with which the ball leaves the hend by holding down the spece bar. Automatic scoreboard display and Pinspotter.

16K Tape
or Disk **$14.95** Tape
TRS-80 I (Level II) **$20.95** Disk
or Model III

plus $2.00 shipping and handling.

Acorn Software Products, Inc.

634 North Carolina Avenue, S.E. Washington, D.C. 20003

We've Grown On You.

And, our selection of programs for your TRS-80 I & III expands with a new program monthly.

Mail to: ACORN SOFTWARE PRODUCTS
634 North Carolina Avenue, S.E. Washington, D.C. 20003 **T-8**

Please send these Acorn Programs:

_____ _____ _____

_____ _____ _____

Charge to: **TOTAL: $**_____

☐ VISA ☐ MASTERCARD ☐ CHECK ENCLOSED

CARD NO. _____ EXP. DATE _____

☐ **Please send your catalog** To Order By Phone CALL: **(202) 544-4259**

Name _____

Address _____

City _____ State _____ Zip _____

COMMANDER 80

"Waiting with a used car-salesman's smile. . . is the slickest operation in the whole world."

So you want to make a million dollars by writing computer software? Well join the club. You'd better have a lot of patience. I've yet to meet the person who became wealthy by authoring software. Admittedly, money *is* to be made but hold on to your day job. And don't order the yacht or the Rolls Royce yet because no software publisher stuffs rolls of banknotes into a programmer's sweaty palms.

For one thing, the industry is still growing. The publisher who's going to get a million-seller doesn't exist yet. In fact, the people who've made the most money in the business are authors who've taken the time to market their own product. This is becoming harder and harder as the business becomes more sophisticated. Professional packaging, customer support and the hard sell all take time; and that's time you could use to write your next hot product. Many programmers realize this early on in the game and farm out some of their programs to software-hungry publishing houses.

Remember, these guys are new to the game too. Software publishers did not exist five years ago, so any publisher you care to name is, in a word, inexperienced. That inexperience manifests itself in a number of ways, most of them detrimental to both programmer and publisher, but more so to the programmer. If the publisher plays his cards right, you both stand to make money; if not he probably has you by the short and curlies.

You'll have that nice contract to look at. It will remind you that you're locked into your agreement until you're ninety-two years old. Many contracts proffered by publishers take unbelievable liberties with your rights and leave you totally at their mercy. Their mercy to make all the mistakes a growing industry makes; and with your toil and sweat. This points up another disturbing attitude amongst a number of publishers (and for some reason, this is worst amongst the larger houses) and that is the holler-then-thou syndrome.

They'll actively solicit your software (after all, what else are software houses going to sell?), then treat you like dirt. Picture this scenario: You churn out your latest piece of programming magic which, let's say, makes it ten times easier to load tape programs on the computer. You know full well how many tape-loading problems you've had to deal with and you are about to ease the miseries of thousands of computer owners that share that burden. You look around and what do you see? Waiting with a used car-salesman's smile—teeth glinting like an Ultrabrite ad—is the newest, slickest operation in the whole wide world. How can you possibly resist the sweet-talking and the promises? Besides, they're backed by capital and previous success in other fields.

"Many contracts. . . take unbelievable liberties with your rights."

You go for it. Your program is sucked with an obscene slurp into their newly-manufactured freshly-polished finely-honed machinery. You check your mailbox every hour for the next three weeks. Lo and behold, on the fifth week you receive a contract. They love the program so much they offer you an advance of $3000 against future royalties. You'll have earned it all back within three or four months and will be on a percentage after that. After scouring the contract and reluctantly reassigning various rights, you return it along with a program for the Color Computer which you're certain they're going to be equally enthralled with. Your future is assured and you make plans to be writing more software in anticipation of this growing demand from a software-hungry public.

Meanwhile, back at the publishers' place they've decided they like your latest offering too. This one doesn't have quite the market of your first product so you're offered a mere $1500. Amazing how these guys have such a firm handle on the market after such a short time in the business, but that's close on $5000 ready to be tipped into your bank account. Things are looking good. Maybe it's time to take a trip to the Bahamas and think about writing your next gem of software. After all, you don't want to slacken off in the face of success. So where's the check for $3000. Nobody buys airplane tickets with buttons so you give your new-found colleagues a call. Of course, at precisely the point when you're riding so high on your hopes and expectations is the point at which the house of cards will choose to collapse.

They've had second thoughts about the first program. They're not sure it's a stand-alone product. The publisher feels that if you could only wait for a similar piece of software to arrive (maybe six months, maybe a year, maybe never) that they'd have a fine package. Amazing again! These professionels are. . . well. . . so professional! They've been in the business six months and are making such inspired, enlightened judgments as if they'd been at it for twenty years. But what about the contract? Well, the contract wasn't really a contract at all until it was signed by both parties so it's a piece of paper showing your intent and nothing more.

Naturally, you're rather annoyed. You've lost a good three month's worth of marketing time for your program and have nothing to show for the time you've taken to play this new computer game. At least these guys get paid for it though. You're left holding a useless piece of returned

contract and decide to talk to the guy in charge. You refuse to be treated like this without at least squealing like a stuck pig. But those teeth are still glinting mercilessly down the telephone. This fellow is a real pro. After all, he passed the job interview with some high-powered executives which means he's going to have no problem with you.

So you put the phone down knowing how bad they feel about the miserable treatment they've meted out to you. At least they realize and regret what they did, but business is business and it's better in the long run if they make their mistakes early on. Anyway, there's still that Color Computer program and the $1500 advance on the way; there's hope yet. In the meantime, you forget the Bahamas and continue writing software in the freezing back room. Now that you understand these fellows better, you're in a much better position to supply what they "know" will sell.

Suddenly the Ace of Spades comes floating past your eyes, the Joker hard on his heels followed by your trump card—the Color Computer program. The house of cards finally collapsed in its entirety—they don't want your program. Not enough market. Sorry. Yes, we have treated you poorly, haven't we?

Talk about *caveat emptor*! This is dog eat dog and let the devil take the hindmost. If you think this anecdote is an exaggeration in order to make my point, let me tell you that I have close ties with the person it happened to. By now you probably have deduced it was sucker features here—me. Apart from an embellishment or two (just for effect, you understand), that's the way it happened.

Well, some of the lessons come easy, some come hard. I just had one of the hard ones, that's all. If nothing else, I'm prepared to try and learn from that mistake and share the experience publicly to warn other starry-eyed potential software authors. If you take the time to analyze the steps I took with that particular publisher, you can probably think of numerous safeguards I could have taken to be in a less vulnerable position.

I should also point out that not all publishers will dish out this kind of treatment. After all, many of them have been in this game for four years or more. Wow! A whole four years; excuse me if that doesn't impress me too much any more. Both authors and publishers *are* making some primordial mistakes and, as usual, it's the little guy who gets knocked about the most. So use some of the same savvy that made you a programmer in the first place. Let the seller beware. ■

Now...from Dr. David Lien, the master of making the difficult simple, comes the complete way to HARNESS YOUR TRS-80

Face it. Until you can talk to and understand your Model I, II, III or 16 Tandy TRS-80*, it's nothing more than a mass of microcircuits in a plastic box.

You need help to harness your TRS-80 and make it work for you. And that's just what you get from *Learning TRS-80 BASIC*.

Written by David Lien, author of the popular TRS-80 User's Manual for Level I, Learning Level II and *The BASIC Handbook, Learning TRS-80 BASIC* is at once entertaining, informative and easy to understand. It's the perfect guide to entering the world of microcomputers.

In *Learning TRS-80 BASIC*, David Lien gives you simple, step-by-step instructions, including programs you can use in business or home finance, for entertainment, or to help troubleshoot problems. You'll even learn to write your own custom software. Ideal for the classroom, too.

Included are short Question and Answer sections which help make sure you understand everything you've learned—it's almost like a correspondence course ... without the correspondence!

No matter if you own the Model I, II, III or 16, *Learning TRS-80 BASIC* is one book no TRS-80 owner should be without.

Available at better computer and book stores,
or call (800) 854-6505
In California (714) 588-0996

Ask about the Basic Handbook, too. To order by mail, send check or money order for $19.95 (California residents add 6%), plus $1.65 shipping and handling. Overseas orders send $19.95 plus $2.50 surface shipping and handling. All books have a 30-day money-back guarantee—you can't lose.

VISA
MasterCard

CompuSoft® Publishing

1050-E Pioneer Way, Dept. F, El Cajon, CA 92020

365

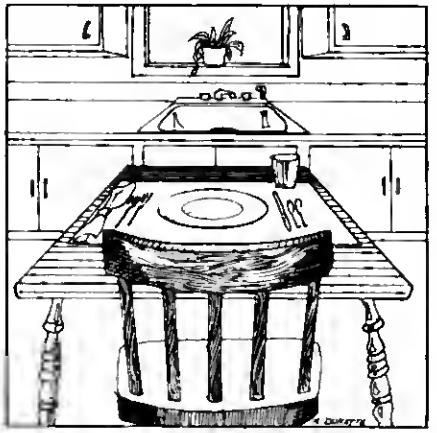
*TRS 80 is a registered trademark of the Tandy Corporation.

See List of Advertisers on page 338

News From KITCHEN TABLE SOFTWARE, INC.

by David Busch

"New Jersey State Assembly Adventure and Haunted Delicatessen seem too specialized or obscure to be of much interest.



Question: What popular computer program requires risk of life, long hours hunting for elusive rewards and solving an obscure puzzle wrapped in an enigma?

Answer: If you said DROSSDOS 1.1, you were right! However, because this is *80 Micro*'s games issue, I've decided to look at Kitchen Table's latest game offerings, not its operating system.

The flood of programs copying Adventure has led me to conclude nearly any idiot can write an adventure game. Apparently the folks at KTI have made the same observation.

I strongly suspect the crew at the world-famous hardware-software vendor took one of their usual shortcuts and purchased an adventure generator from an outside source. My suspicions stem from KTI's introducing no less than 247 adventures in two weeks.

Some of these, like New Jersey State Assembly Adventure and Haunted Delicatessen, seem too specialized or obscure to be of much interest. Others, like Peanut Farmer and Mood Ring, are outdated for the 80s. A few KTI games, especially Small Engine Maintenance and Savage Bus Stop, appear very derivative of adventures already on the market.

I liked Mailmen Adventure and spent several happy hours figuring out the correct route. As in most adventures, two-word, subject-verb commands are used, like TAKE MAIL, KILL DOG, and KISS HOUSEWIFE. I won't give any hints to spoil the fun, but when in the hardware store, do not type TAKE INVENTORY or you could be held up for three days counting carriage bolts!

My second favorite game was Programmer's Dungeon. Each player assumes the guise of a programmer. Among the roles are Software Sage, Assembly Language Wizard, Cobol Warrior, and Basic Dwarf.

Each character has powers and attributes determined at the start of the game. Assembly Language Wizard may use CALLs, wield mystical registers with aplomb, and battle the vicious ORG. The wizard is not mobile, however, because of his difficulty relocating. Most players will not understand this character and ignore him. The exception is the Machine Language Troll, who can only be addressed through the wizard or by use of the magic scepter, T-Bug.

On the other hand, the Basic Dwarf is clumsy but easily understood. His weapons include the For. . . Next loop (used to garrot enemies). By uttering GOSUB, he may send an opponent to the dreaded Subroutine, perhaps never to return.

Cobol Warrior is all business, while Fortran Elf carries his weapons in a plastic pocket protector in his breast pocket. The Lisp Fairy spends his time prancing about merrily.

In the game, each player is a crack programmer who must locate all the bugs in a piece of software before sending it to a magazine for publication. If one bug is missed, the computer writes a letter to the magazine's editor explaining the program's functions can be performed with a single NEWDOS80 command.

Programmer's Dungeon is quite realistic. In fact, the game itself is the program that must be debugged. I found it fascinating to be confronted with UNDEFINED LINE IN 11210 in the middle of the game.

It is possible to cheat at this game. I handily sidestepped all traps by adding a single line: 10 ON ERROR RUN.

One problem, however, is this is KTI's first 3D talking adventure. Personally, I found wearing the red and green 3D glasses annoying. With my Green Screen installed, I could see my CRT through the green lens, but the red one rendered the screen invisible.

Also disconcerting was the voice synthesis effect. I didn't find the voice messages helpful. Typical rejoinders included "You just tried to write to ROM, fool!" and "Congratulations! You are the first person to ever try and PEEK (47345½)." I scrapped the whole thing and substituted tapes by "The Clash," "The Stray Cats," and "The Undertones." The messages were no more abusive, but infinitely more entertaining.

Realism freaks will be glad to know KTI is applying its 3D-talking concept to checkers. The boring, flat checkerboard is rendered in full three-dimensional glory and brought to life with vivid sound effects. Crystal clear click-click-click noises are generated as checkers move. The computer intones "Your move," and takes on a gleeful note when it utters "Crown me!"

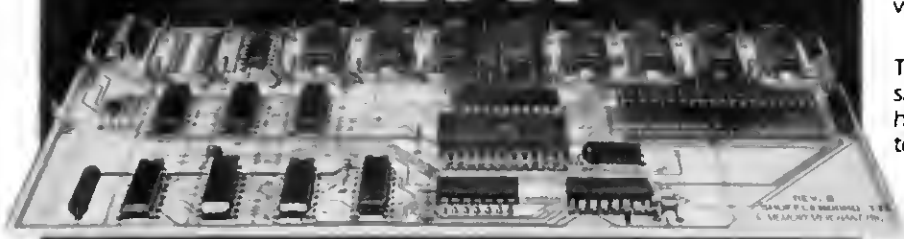
Several levels of play are provided. At the level recommended for children, the computer tips over the checkerboard when it sees it may lose. At the adolescent level, the same thing happens—only the computer pretends it was an accident. When the computer loses at the adult level, it pretends not to care and challenges the winner to a game of backgammon. And at the highest level—International Grand Checker Master—the computer looks ahead more than 40 moves to determine the best strategy, sometimes taking a half hour to determine it will be defeated and must tip over the checkerboard.

I pitted 3D Checkers against Sargon II. The confrontation proved a draw. But I judged 3D Checkers the winner, because I finished the game with more kings.

Kitchen Table has also introduced some interesting game utilities. Despace Invaders will search your disks and kill all Space Invaders variations it finds. The utility should be as popular as DeTrek and DeWumpus. A similar utility would be useful for biorhythm, diet and hangman.

The current mania for computer games

INTRODUCING 64K CP/M 2.2 FOR MODEL III $299.



Now you can run WordStar, SuperCalc, SpellGuard, MailMerge and other CP/M based software on your TRS-80 Model III.

And walk away with incredible savings.

Memory Merchant's new Shuffleboard III is the first and only 64K CP/M 2.2 system available for your Model III.

SOPHISTICATED DESIGN

The Shuffleboard III's advanced design includes 16K of RAM, giving your Model III the power of full 64K CP/M 2.2, without interference of the ROM or the video memory.

COMPLETE CP/M SYSTEM

The Shuffleboard III is not a kit, nor a skeleton. You will receive a top quality, high performance system that is shipped to you completely assembled, burned-in, tested and insured with one of the industry's best warranties.

EASY INSTALLATION & USE

Illustrated step-by-step instructions insure fail-safe installation and reliable operation. No permanent modifications, cut traces or soldering is required.

The Shuffleboard III easily plugs into two existing sockets inside your Model III. Simple keyboard commands switch between CP/M and normal TRS-80 operation.

NO RISK TRIAL

We are so convinced that you will be absolutely delighted with your Shuffleboard III system that we offer a no risk trial. After purchasing the Shuffleboard III system, you may return it (intact) for any reason within 15 days after shipment and we will refund the purchase price (less shipping).

SHIPPED DIRECT FROM STOCK

The Shuffleboard III is shipped to you direct from stock, normally within 48 hours after receipt of your order.

INTRODUCTORY PRICE

For a limited time, Memory Merchant is offering the Shuffleboard III with CP/M 2.2 at an introductory price of only **$299.**

1 YEAR LIMITED WARRANTY

The Shuffleboard III's reliability, through quality controlled production and proven performance, has enabled us to offer a full 1 year limited warranty.

HOW TO ORDER

Please send check, money order, VISA or MASTERCHARGE (add ICA #) with your order. Sorry, no C.O.D's. Specify quantity desired. Shipping and handling charge is $5.00 per board ($9.00 outside USA & Canada)* California residents add 6% or 6½% Sales Tax where applicable. Credit card purchases may be telephoned to (415) 483-1008. Order Today!

OEM and DEALER inquiries invited.

*Air Mail shipments to Canada & all other countries.

Memory Merchant™

14666 Doolittle Dr., San Leandro, CA 94577
Telephone (415) 483-1008

461

Trademarks Shuffleboard III/Memory Merchant, TRS-80 Model III/Tandy Corporation, MailMerge, WordStar/MicroPro, SuperCalc/Sorcim, SpellGuard/ISA, Inc., CP/M 2.2/Digital Research
Prices, terms and specifications are subject to change without notice

Still Searching?

What Does The Bible Say?

And Where?

Now you can use computer technology to search the Bible on any subject. With THE WORD processor (including a disk copy of the complete KJV Bible text) you can create indexes on keywords. Or phrases. Even on concepts.

A full spectrum of text search functions allows detailed analysis for the real student of the Bible.

Print or display selected verses and/or references for personal study or Bible classes. Build your own computerized library of research material.

THE WORD processor

$159.95*

Bible Research Systems • 8804 Wildridge Drive • Austin, Texas 78759 • (512) 346-2181
or call Your Local Dealer

Requires 48K, 1 disk drive, APPLE or TRS-80
APPLE is a trademark of APPLE Computer, Inc.

315

* Plus $2.50 postage/handling
TRS-80 is a trademark of Tandy Corp.

NEW CLASSICS SOFTWARE

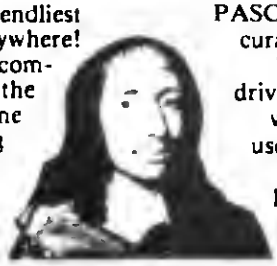
239 FOX HILL ROAD·DENVILLE NEW JERSEY·07834·TELEPHONE 201·625·8838

PASCAL 80 by Phelps Gates

"If anyone could devise a good PASCAL system for the TRS-80® it was Phelps Gates. I am happy to report he has done just that."
BYTE, Dec. 1981, pg. 304

"After trying out...(the competition) I found myself using PASCAL 80 exclusively." Creative Computing, Nov. 1981, pg. 96

PASCAL 80 is the friendliest PASCAL available anywhere! Monitor, editor, and compiler are in memory at the same time, avoiding time consuming and annoying disk access and disk switching. Yet, it uses standard PASCAL syntax and leaves 23K of work space in 48K (32K at run time).



PASCAL 80 has 14 digit accuracy and requires a 48K TRS-80® with one disk drive. It comes in a binder with easy and complete user instructions for $99. Add $2 shipping and handling per order and specify Model I or Model III.

Credit card orders: (201) 625-8838

NEW CLASSICS SOFTWARE
239 Fox Hill Road
Denville, NJ 07834

(PASCAL 80 does not implement variant records, pointer and window variables, or functions and procedures used as parameters.)

255

KITCHEN TABLE

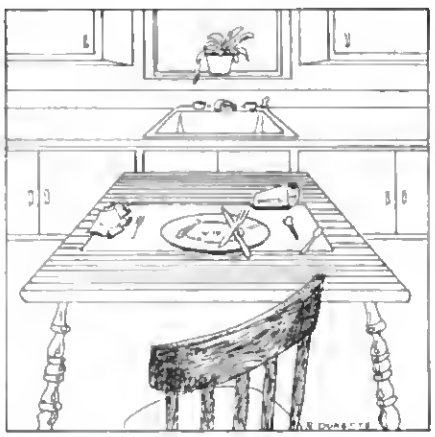
has touched a greedy chord in the KTI hierarchy and it has established a software acquisition department. Since even the most inept programmer could create something better than KTI's staff could produce, the doorway is wide open. Game submissions should meet the following guidelines:

- All games must not contain any original concepts. They should be based on existing arcade, computer, board or television games with proven popularity. Computer games must have an original twist—like renumbering or changing a few variable names—to protect KTI from copyright infringement suits.
- The programmer must be prepared to become rich. Kitchen Table marketing consultants point out there ere more than 300,000 TRS-80 and TLS-8E owners in the United States. If only 50 percent of them purchase a KTI game at the list price of $99, then the programmer's 10 percent royalty amounts to $1.5 million! Since an average KTI game requires two weeks to write, debug, document and market, an industrious programmer could earn $3 million a month.

Eager programmers should know KTI starts paying royalties three years after a program is accepted. Programmers in need for immediate funds have submitted their programs to KTI's monthly magazine ZAP!, which pays on acceptance. They reason $60-$100 now is more valuable than $1.5 million two or three yeers from now.

- Games should be accompanied by a $1,000 evaluation fee, which will be applied to royalties if the author is alive when they come due.

Watch for the Kitchen Table Games line on the pegboard at your local computer dealer soon. If you know anyone who has bought one, please let the folks at KTI know. They're waiting for some brave soul to break the ice. ■



GIMME FIVE!
BIG FIVE, THAT IS

DEFENSE COMMAND

Several months ago the Kromorfkrom Empire invaded our planet and stole some of our newly developed and highly efficient "Krotnium" Star Cruiser fuel cells. Your mission is to infiltrate the Kromorfkrom Empire and pass yourself off as the commanding officer of one of their fuel vessels. Eventually you will be discovered and then it's battle time! Sound and joystick control make this another winner.

Cat. No. 3853	Mod. I & III, 16K, cass	$15.95
Cat. No. 3854	Mod I & III, 32K, disk	$19.95

STELLAR ESCORT

Five billion light years from Kromorfkrom, Federation forces have been at war with the hostile Cretonian Empire. Unfortunately, the Cretonians attacked by surprise and now your forces are almost out of supplies. It's up to you, the Escort fighter pilot, to save the Federation. Sound and joystick option are included.

Cat. No. 3855	Mod I & III, 16K, cass	$15.95
Cat. No. 3856	Mod I & III, 32K, disk	$19.95

GALAXY INVASION

Cruel and crafty invaders have been spotted in battle formation warping towards Earth. You must quickly eliminate the aliens as they swoop down upon you. Includes sound and joystick action.

Cat. No. 3847	Mod I & III, 16K, cass	$15.95
Cat. No. 3848	Mod I & III, 32K, disk	$19.95

ATTACK FORCE

In this fast-paced machine language game, eight alien Ramships are warping toward your ship. You must dodge them and fire missiles to destroy them before they get you! Sound and Joystick options are included.

Cat. No. 3849	Mod I & III, 16K, cass	$15.95
Cat. No. 3850	Mod I & III, 32K, disk	$19.95

ROBOT ATTACK

Evil robots from the planet Jidya have overtaken one of Earth's valuable Space Stations. Space Central is counting on YOU to invade the station and conquer the robots. You must act quickly and boldly in order to carry out your mission. ROBOT ATTACK features sound effects and either keyboard or joystick control.

Cat. No. 3851	Mod I & III, 16K, Cass.	$15.95
Cat. No. 3852	Mod I & III, 32K, disk	$19.95

COSMIC FIGHTER

Draft those pesky aliens! Your mission is to clear the skies of the invading aliens. As soon as space is clear, along comes another set. Keep shooting but watch out, your fuel is getting low. Good luck. Includes sound and joystick capability.

Cat. No. 3213	Mod I & III, 16K, cass	$15.95
Cat. No. 3213	Mod I & III, 32K, disk	$19.95

METEOR MISSION 2

Emergency! Your astronauts are in trouble. You must maneuver through the asteroids and meteors in order to save your men and get them to the space station. Complete with sound and joystick option.

Cat. No. 3214	Mod I & III, 16K, cass	$15.95
Cat. No. 3215	Mod I & III, 32K, disk	$19.95

SUPER NOVA

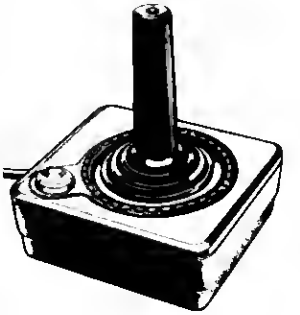
SUPER NOVA is a fast paced real-time game for one or two players. The object is to destroy as many asteroids and aliens as possible without getting destroyed. Hitting a large asteroid causes it to break into smaller asteroids. Aliens and their flagship will appear on the screen and try to shoot you out of the sky.

Cat. No. 3845	Mod I & III, 16K, cass	$15.95
Cat. No. 3846	Mod I & III, 32K, disk	$19.95

TRISSTICK

Model I and Model III owners may now use a joystick for better response in those fast-action programs. The TRISSTICK is compatible with all BIG FIVE software and comes complete with instructions for easy implementation into your own programs. It features the famous Atari joystick and plugs right in to your machine. There's no modification or wiring needed!

Cat. No. 3939	Model I	$39.95
Cat. No. 3929	Model III	$39.95



"EXTRA SPECIAL" SPECIAL
Purchase any three or more BIG FIVE programs and take 10% off. Combined with FREE SHIPPING offer, it's just too good to be true.

HOW TO ORDER
Write or phone. Pay by check, M/C, VISA, or COD (add $1.50 for COD).
(800)423-5387 (213) 886-9200. Offer expires Aug. 31, 1982
Mention this ad and we pay shipping (UPS ground only).
HW Electronics 19511 Business Center Dr. Dept. V8 Northric CA 91324

WHEN IN SOUTHERN CALIFORNIA, VISIT OUR RETAIL STORES

HW ELECTRONICS

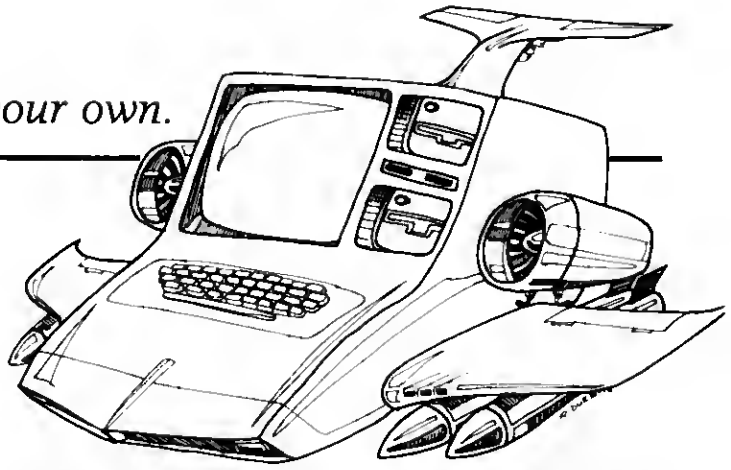
19511 Business Center Dr.
Northridge, CA 91324

2301 Artesia Blvd.
Redondo Beach, CA 90277

444 S. Indian
Palm Springs, CA 92262

Play this adventure, then program your own.

Assignment 46



Victor T. Albino
18501 194 N.E.
Woodinville, WA 98072

Last December a character by the name of Harry A. Flynn made his *80 Micro* debut in a program called Assignment 45. Commander Flynn shot over alien terrain in a jet sled, broke through force fields, fought laser wielding robots and circumvented a booby-trapped computer installation to rescue a lovely damsel in distress. Well, Harry is back. And in Assignment 46, he is better than ever.

But this time, in addition to the adventure, there is a detailed description of how the program works, including flowcharts of all the decision brenching questions. In fact, this is a complete explanation of how to create your own adventures from storyline development to the final touches. This is a true anatomy of an adventure. If you really want to enjoy the program enter and play it before reading any further, because during the explanation ot the program, all of its secrets will be revealed.

One hint before you start. If you have tried every possible choice at one of the decision points and still fail, it is not the program. You probably made an incorrect decision somewhere earlier. This adventure is like real life where we sometimes do not learn about our mistakes until later.

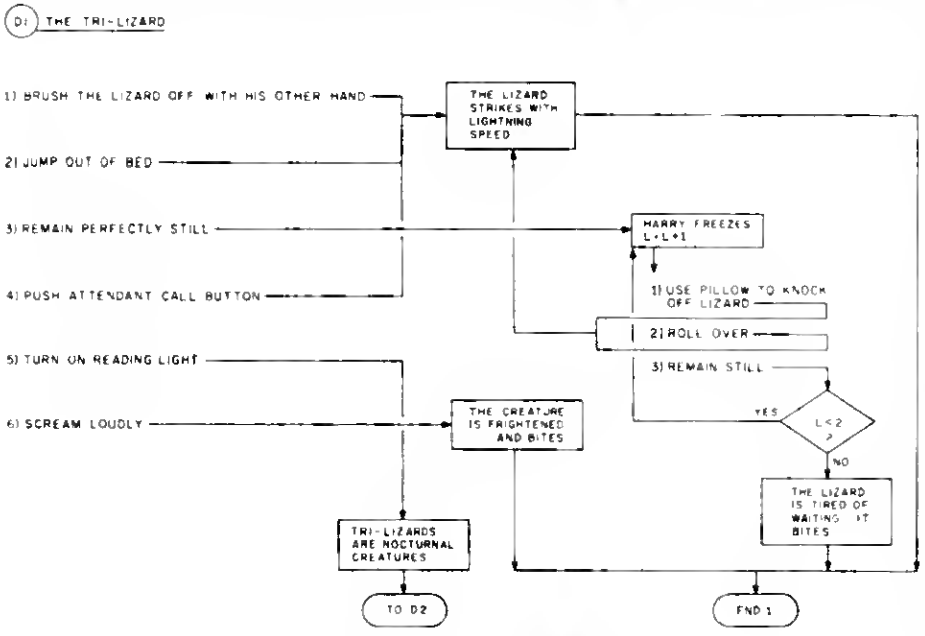


Fig. 1. D1—The Tri-Lizard

The Beginning

All stories originate with an idea, but how do you get a good idea for an adventure? One method is association. Begin with disconnected story elements and think of ways in which they might interact. The story element list can be divided into four main categories: people, places, life forms and things.

Most of these element parts never make

PEOPLE	LIFE FORMS	PLACES	THINGS
Commander Harry A. Flynn	Sandies	Space station oasis	Robot Giant
Sector Chief Chronos	Armadillian	Tomb world	Mako Jet Sled
Major Orr	Feminoids	Crystallia (crystal planet)	Laser ring
Honi Pott	Greenies	Stargates	Mini-nuke shirt button grenade
Dr. Non from K.R.U.E.L.	Slime Devils	Jungle Planet	Sedation lipstick
Storm Troopers	Tri-Lizards	Desert Planet	Gold
Col. Zigfried Syn		Luxury passenger cruiser	Diamonds
Leone Dracone		Gambling casino	Power crystals
		Ice Age Planet	Tube gun and darts
			Tri-corder wristwatch
			Homer dart

Table 1. Story Elements List

it into the story. When creating the list don't worry about possible associations. At this point you are only interested in brainstorming to gather ideas.

Since Assignment 46 followed Assignment 45, there were already a few characters I carried over into the new edventure. Certainly the hero, Commander Harry A.

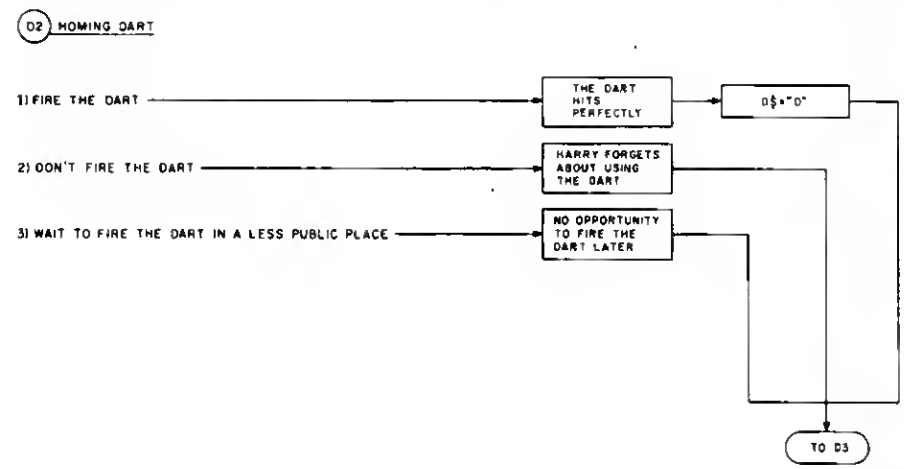


Fig. 2. D2—Homing Dart

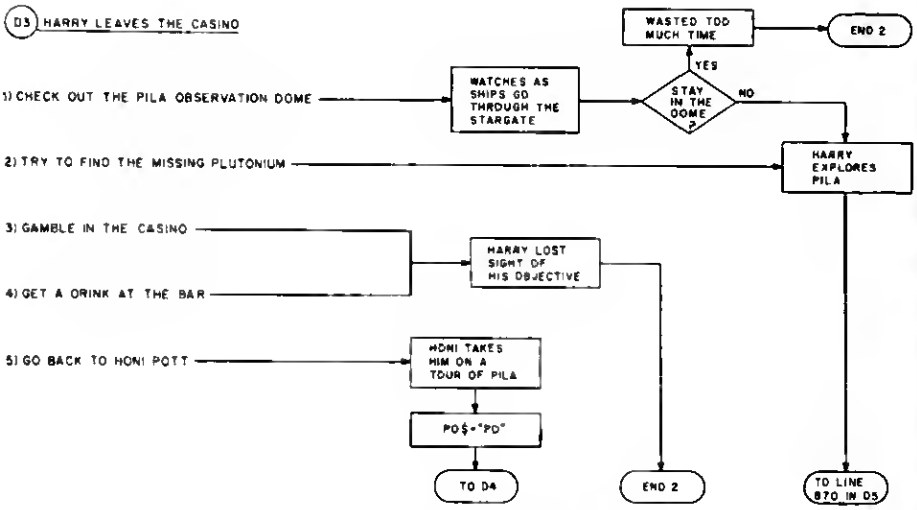


Fig. 3. D3—Harry leaves the casino

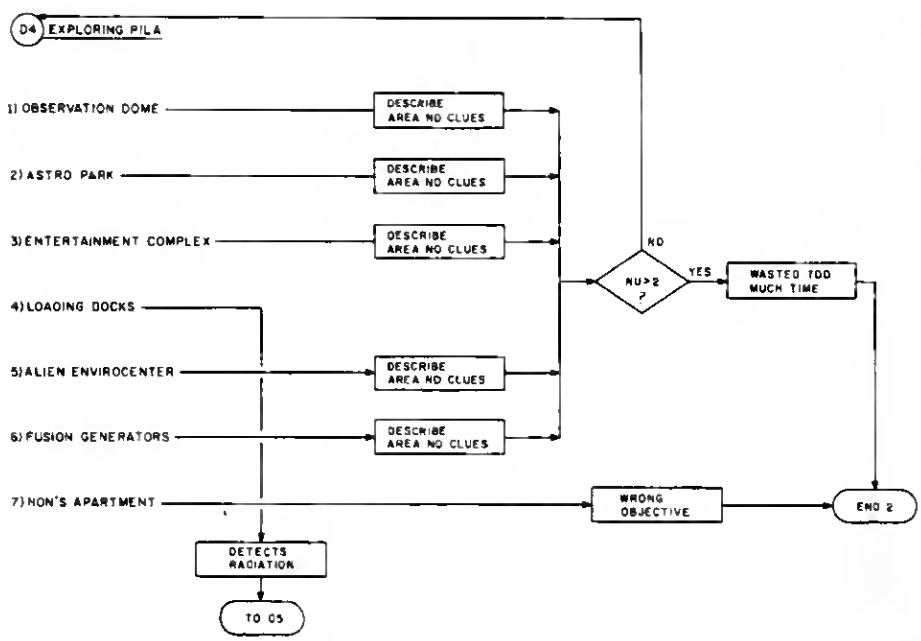


Fig. 4. D4—Exploring Pila

Here's The Book That's A **Byte Above** The Rest!

TRS 80 Model III: Programming and Applications

Larry Joel Goldstein, PhD and Martin Goldstein

Here's a top-notch introduction to programming and using your TRS 80 Model III! From BASIC to the more complex application, *TRS 80 Model III: Programming and Applications* does it all with a unique sense of ease and clarity while promoting user-confidence.

(1982/320pp/paper/ISBN 0-89303-050-3/Prod. No. 9390/$14.95)

Order today! Use our coupon or call Toll-Free 800-638-0220 (MD residents 301-262-6300).

Brady Robert J. Brady Co. Bowie, Md. 20715

COUPON

YES! Please rush me **TRS 80 Model III: Programming and Applications**/Prod. No. 9390/$14.95. I've noted my payment option below.

Name _____

Address _____

_____

Phone No. _____

Signature _____

_____ Check/MO attached (I've added $1.95 for postage & handling)

_____ Visa _____ MasterCard

Acct. No. _____

Expiration Date _____

MD, PA, MA, CA, IL, NJ, FL, and DC residents add local sales tax.

Brady orders by phone: toll-free (800) 638-0220, in Maryland (301) 262-6300

Robert J. Brady Co. Bowie, Maryland 20715 • (301) 262-6300

314

See List of Advertisers on page 338

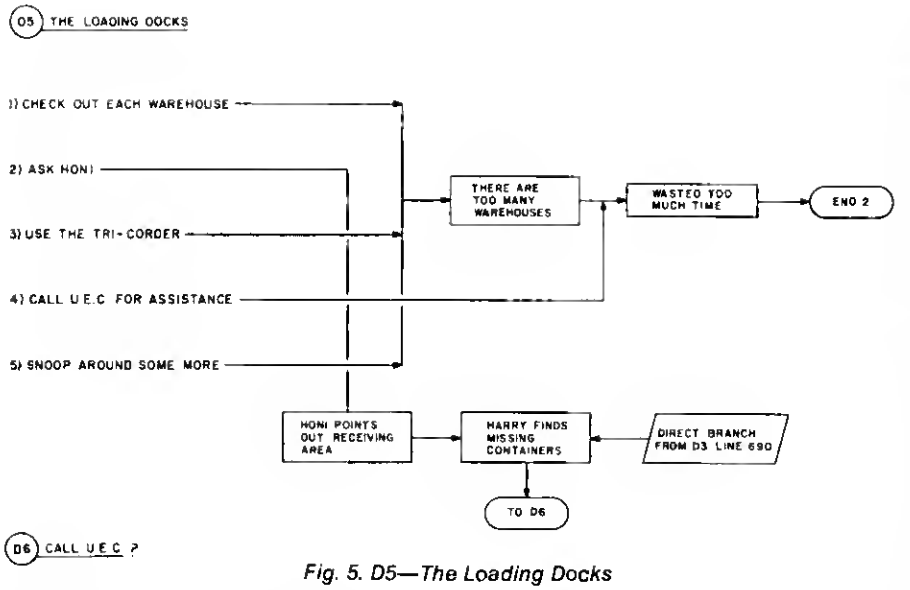


Fig. 5. D5—The Loading Docks

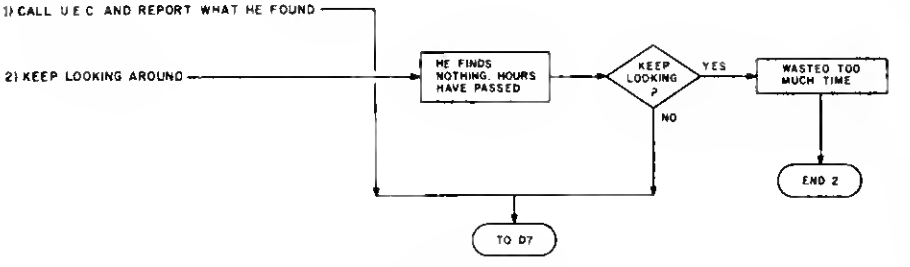


Fig. 6. D6—Call U.E.C.?

Flynn, and his director, Sector Chief Chronos, would be there. Others from the earlier adventure such as Major Orr and the infamous Dr. Non, while placed on the list, were not needed in the new story. Just two or three elements from each category were all that was necessary to create a basic story line. The important thing to remember is: Exciting stories contain exciting elements. Let your imagination go and come up with as many items as you can in each category.

Using the elements in your list, formulate a general plot from the thousands of possible combinations of people, places and things. The plot outline for Assignment 46 would show how Harry, working with Honi Pott, uses homer darts and laser rings to overcome an Armadillan bodyguard, a venomous tri-lizard and ultimately the super villain himself, Leo Dracone. All of this is accomplished in e setting of luxury passenger starcruisers, gambling casinos and space cities forming a ring around the only known stargate to Andromeda.

The Program Listing— One Step at a Time

This program can be broken down into 12 distinct segments: the introduction, ten major decision branching questions and finale. The introduction sets the stage and explains the mission. The finale, of course, finishes the adventure, but it can end in one of three different ways. The adventurer can

CONVERT YOUR TRS-80 MODEL-I OR III INTO A

DEVELOPMENT SYSTEM

Now you can develop Z-80 based, stand-alone devices such as games, robots, instruments and peripheral controllers, by using your TRS-80 as a development system. The DEVELOPMATE plugs into the expansion connector of your TRS-80 and adds **PROM PROGRAMMING** and **IN-CIRCUIT-EMULATION** capabilities to your system (with or without expansion interface).

Complete instructions and sample schematics are included to help you design your own simple stand-alone microcomputer systems. THESE SYSTEMS CAN BE AS SIMPLE AS FOUR ICs: one TTL circuit for clock and reset, a Z-80, an EPROM, and one peripheral interface chip.

When the In-Circuit-Emulation cable is plugged into the Z-80 socket of your stand-alone system, the system becomes a part of your TRS-80: You can use the full power of your editor/assembler's debug and trace program to check out both the hardware and the software. Simple test loops can be used to check out the hardware, then the system program can be run to debug the logic of your stand-alone device.

Since the program is kept in TRS-80 RAM, changes can be made quickly and easily. When your stand-alone device works as desired, you use the Developmate's PROM PROGRAMMER to copy the program into a PROM. With this PROM, and a Z-80 in place of the emulation cable, your stand-alone device will work by itself.

The DEVELOPMATE is extremely compact: Both the PROM programmer and the In-Circuit-Emulator are in one small plastic box only 3.2" x 5.4". A line-plug mounted power supply is included. The PROM programmer has a "personality module" which defines the voltages and connections of the PROM so that future devices can be accommodated. However, the system comes with a "universal" personality module which handles 2758, 2508 (8K), 2716, 2516 (16K), 2532 (32K), as well as the new electrically alterable 2816 and 48016 (16K EEPROMs).

The COMPLETE DEVELOPMATE 81, for Model I, with software, power supply, emulation cable, TRS-80 cable, and "universal" personality module $329

DEVELOPMATE 83, Model III version, same as above $329

PM2 PERSONALITY MODULE for 2732A EPROM $15

PM3 PERSONALITY MODULE for 2764 EPROM $15

ORION
INSTRUMENTS
172 Otis Avenue, Dept. M, Woodside, CA 94062
(415) 851-1172 ↙ 151

Master Charge and Visa phone orders accepted
California residents please add 6 % sales tax

die and consequently fail his mission, or he can live, but still fail, or he can succeed. The decision branching questions are limited to about 10 or 11 situations because that is about all one can fit into a 16K machine and still have enough memory left to accommodate the narration necessary to tie the adventure together.

Figures 1-10 flowchart each of the 10 main decision points in the program. Flowcharting is essential for a clear understanding of the results of each action an adven-

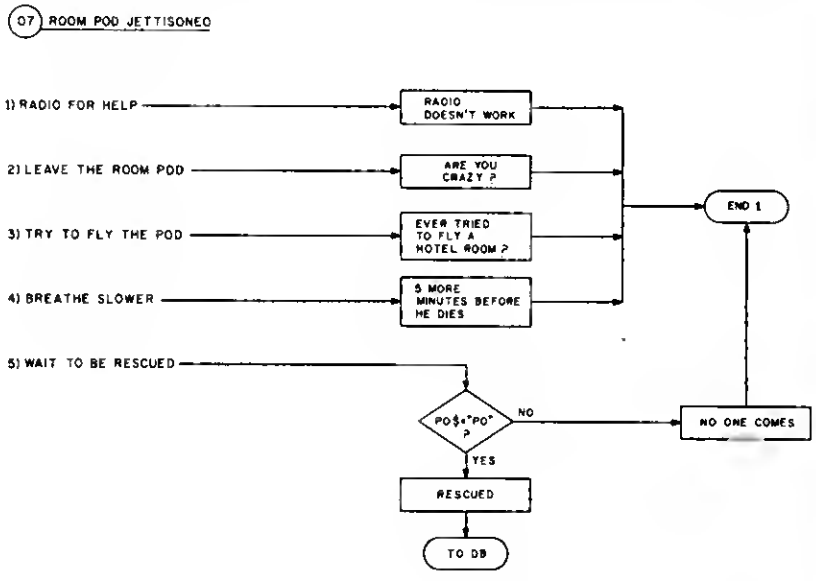


Fig. 7. D7—Room pod jettisoned

Program Listing

```
0 CLS
10 REM ** ASSIGNMENT 46
        BY VICTOR T. ALBINO  JAN. 1982
20 R=902:H$="HIT '/ ' KEY":GOTO50
30 IFINKEY$<>"/"THEN30ELSECLS:RETURN
40 FORT=1TO1500:NEXT:RETURN
50 PRINT@278,"ASSIGNMENT 46":GOSUB40
60 PRINT@463,"A HARRY FLYNN (TM) ADVENTURE":GOSUB40
65 PRINT@604,"BY":PRINT@725,"VICTOR T. ALBINO":GOSUB40:CLS
70 PRINT@342,"YEAR:  2154":GOSUB40
80 PRINT@460,"PLACE:  A SANOY BEACH ON MON KARLO
                      THE PLEASURE PLANET
90 GOSUB40
100 PRINT@726,"TIME:  3:20 PM":GOSUB40:GOSUB40:CLS
110 PRINT@320,"COMMANDER HARRY A. FLYNN, UNITED EARTH COMMAND (U
EC), LIES ON
THE SAND.  HE IS PENSIVE WHILE HE WATCHES THE REFLECTION OF THE
HOT SUN DANCE ON HIS RUBY LASER RING.

SUDDENLY, A SIGNAL BLARES OUT AS HIS COMMUNICATOR SWITCHES ON.
120 PRINT@H,H$;:GOSUB30
130 PRINT"HELLO HARRY.  THIS IS SECTOR CHIEF CRONOS.
SORRY TO INTERRUPT YOUR VACATION, BUT WE JUST RECEIVED
INFORMATION THAT THE RING CITY OF PILA IS IN DANGER.
140 PRINT"THE CITY ENCIRCLES THE PILA STARGATE WHICH IS THE ONLY

WAY TO REACH THE GALAXY OF ANDROMEDA.  WE ARE ESPECIALLY
CONCERNED BECAUSED A PLUTONIUM FREIGHTER HEADED FOR PILA
DISAPPEARED YESTERDAY.  THERE'S ENOUGH MATERIAL ABOARD THAT
SHIP";
150 PRINT" TO VAPORIZE THE CITY AND DESTROY THE STARGATE.
SINCE YOU'RE ON VACATION, A VISIT TO THE FAMOUS PILA CASINO
SHOULD NOT RAISE SUSPICION.
155 PRINT:PRINT"YOUR MISSION IS TO PROTECT THE RING CITY AND THE
 PILA STARGATE.
PASSAGE HAS ALREADY BEEN BOOKED FOR YOU ABOARD THE LUXURY LINER
QUEEN ZIRA.
160 PRINT"     GOOD LUCK, COMMANDER.
170 PRINT@H,H$;:GOSUB30
175 CLEAR:P=448:W=150:W$="WHAT SHOULD BE DO?":H=902:H$="HIT '/ '
 KEY":E=906:E$="(ENTER THE NUMBER OF THE ACTION YOU SELECT)"
180 PRINT@64,"IT WAS LATE WHEN HARRY BOARDED THE GIANT LINER.
HE WENT TO HIS CABIN AND FELL ASLEEP.
190 PRINT:PRINT"ONLY HALF AWARE, HARRY FELT THE COOLNESS OF THE
```

Program continues

See List of Advertisers on page 338

MODEL I/III

SUPER SKETCHER MODEL I/III

Have you ever wanted to add graphics to BASIC programs or BASIC subroutines to emulate rather than figure ... or draw schematics charts graphs maps pictures or logos such as ... using graphics & alphanumerics? Save graphics as pages and animate them or print them with your Epson MX-80? SUPER SKETCHER is the answer. It works like a text editor with graphics. It's easy to use and Features • Full Cursor control • Help table • On screen editing • Circle Square Sine Wave & point to point commands • Edit & animate 10 Graphics screens at one time • Save Graphics files BASIC subroutines & programs on Disk or tape • 128x45 or 64x15 display • Built in Epson MX-80 Driver • and much more.

SUPER SKETCHER Mod I/III DISK $29.95

CODES II for the ELECTRIC PENCIL

CODES II for the Model I and the ELECTRIC PENCIL is an easy to use software package that lets you select printer control codes into your PENCIL textfiles with NO hardware add-ons. Shift your printer into Double Wide Condensed, Elongated, character fonts and send any special control codes to your smart printer to get it to do what you bought it for. Codes II loads into the Electric Pencil and includes codes for Epson MX-80, & 100, C.ITOH F-10, Qume Sprint 5, NEC 8023, Diablo 630, Daisywriter 2000, Smith Corona TP-1, Spinwriter 2000 & 3000, Centronics 737/739, MPI B-52, Okidata Microline 80, and one that you can customize.

TAPE $19.95 (Requires lower case) DISK $24.95

DISK INVENTORY SYSTEM MODEL III

DISK INVENTORY for the Model III allows you to keep track of your disks permanently! The Menu Driven keyboard utility lets you search through up to 9[illegible] disks (4752 disk files) in 1 second and display or print them alphabetically by name, extension or disk number. Printer driver has built in page numbers & spooling in all modes and a unique Disk Jacket labeling feature.

MODEL III DISK $29.95

AUTOMATIC MENU SYSTEM MOD III

AUTOMENU for the Model III is more than just an automatic menu system. Just power up and AUTOMENU takes over with a compact menu to Execute, Load or List Programs & Command files or Enter Debug, Kill or System with a single keystroke. Ideally suited for office use!

MODEL III DISK $15.95

DEALER INQUIRIES INVITED

[illegible] weeks for personal checks. C.O.D. orders add $2.00. When ordering by mail add $2.00 for S&H. Minn residents add 5% sales tax. VISA/Master Chg.

VISA/MASTER CHG. ACCEPTED

NELSON SOFTWARE SYSTEMS

[illegible] • Minneapolis, MN 55416 • 612/927-4376

TRS-80 is a registered trademark of Tandy Corp.

TRS-80* MODEL I/III
UO-LISP

Solve artificial intelligence problems, prove theorems, symbolic algebra, TRS-80* graphics. **UO-LISP** is a complete software development program

OPTIMIZING COMPILER AND ASSEMBLER

For the first time on a microcomputer optimized native Z80 code from LISP the **UO-LISP** optimizing compiler creates programs that run up to 50 times faster than interpreted code. Optimized code runs 20 to 30 times faster than equivalent interpreted BASIC

FAST LOAD LIBRARIES

Compiled code can be stored in relocatable files 8 fast load libraries are included in the distribution package

INTERPRETER

Over 125 functions are implemented in the base interpreter

DOCUMENTATION

The manual is 110 pages covering all aspects of the system. Numerous examples of each facility are included

REQUIREMENTS

TRS-80* Model I or Model III, 48K, dual disks

ORDERING

Manual only	$ 20.00
Complete System	$109.00

When ordering specify Model I or Model III.

VISA & MASTERCARD. Please include expiration date and card number.

Send to

FAR WEST SYSTEMS & SOFTWARE
P.O. BOX 3301
EUGENE, OREGON 97403
503-485-5155

454

TRS-80* Model III/I

WOBOS™ I

WESTERN OPERATIONS

Basic Operating System

Who needs it? Everyone who writes or uses programs in BASIC. For Tape systems it's like having a DOS without the hardware! For Disk systems it provides the structure that DOS doesn't!! When you CLOAD this magnificent System you get over 30 powerful programs, routines and subroutines at your direct command or from a 9-choice Menu that can very easily be doubled and customized to your needs. Designed to be used as "stock" for ALL BASIC programs. Simply add your programs to it and never start from scratch EVER AGAIN.

- It will add multifrequency SOUND to your TRS-80
- It will standardize your writing and save you many hours of debugging and rewriting utility functions.
- It will help you structure YOUR OWN programs.

"Once you've used it, you'll never write another program without it!"

Model	III		I		
BASIC	MODEL III	DISK	LEVEL II	DISK	
P. IN	CC 1031	CD 1031	CC 1032	CD 1032	
DEMO	CC1041		CC 1042		

DEMO TAPE: $5 FULLY REFUNDABLE ON QUALITY CASSETTE & MANUAL

ORDER PHONE (503) 646-4626 VISA MasterCard ONLY $35

SEND CHECK, MONEY ORDER OR NUMBER AND EXPIRATION DATE OF YOUR CREDIT CARD TO

W O

179

6640 SW 173 AVENUE, BEAVERTON, OREGON 97007

Dedicated to Excellence since 1976

TRS-80 is a TM of TANDY CORP.

Program continued

```
SLIME TRAIL AS
THE TRI-LIZARD WHICH HAD BEEN PLACED IN HIS BED BEGIN CRAWLING
UP HIS LEFT ARM.  QUICKLY, HARRY OPENED HIS EYES AND STARED AT
THE THREE HEADED, POISONOUS REPTILE.";
195 PRINT"  THE ANIMAL HISSED SOFTLY;
ITS TRREE TOUNGES DARTING IN AND OUT AS IT SLITHERED UP TOWARDS
HARRY'S THROAT.

ONE BITE WOULD BE FATAL.
200 PRINT@H,H$;:GOSUB30
210 CLS:PRINT@W,W$:L=0
220 PRINT@320,"1)  BRUSH THE LIZARD OFF WITH HIS OTHER HAND
230 PRINT"2)  JUNP OUT OF BED
240 PRINT"3)  REMAIN PERFECTLY STILL
250 PRINT"4)  PUSH ATTENDANT CALL BUTTON
260 PRINT"5)  TURN ON THE READING LIGHT
270 PRINT"6)  SCREAM LOUDLY
280 PRINT@E,E$;:INPUTN
290 CLS:IFN<1ORN>6THEN200
300 ONNGOTO310,310,315,310,400,390
310 PRINT@460,"THE LIZARD STRIKES WITH LIGHTNING SPEED !":GOSUB4
0:GOTO5000
315 PRINT@86,"HARRY FREEZES"
320 PRINT@W,W$:PRINT@384,"1)  USE PILLOW TO KNOCK OFF LIZARD.":P
RINT"2)  ROLL OVER QUICKLY":PRINT"3)  REMAIN STILL"
330 PRINT@E,E$;:INPUTN
340 CLS:IFN<1ORN>3THEN330
350 ONNGOTO310,310,360
360 PRINT@470,"HARRY STILL DOESN'T MOVE":GOSUB40:L=L+1
370 CLS:IFL=1THEN320ELSE380
380 PRINT@P,"THE LIZARD IS TIRED OF WAITING... IT BITES":GOSUB40
:GOTO5000
390 PRINT@460,"THE CREATURE IS FRIGHTENED... AND BITES":GOSUB40:
GOTO5000
400 PRINT@P,"TRI-LIZARDS ARE NOCTURNAL CREATURES.  THE HIGH INTE
NSITY
READING LIGHT BLINDS THE ANIMAL.  HARRY PULLS OUT HIS LASER AND
BLASTS IT.
410 PRINT@H,H$;:GOSUB30
420 PRINT@256,"THE ZIRA ARRIVES AT PILA, AND HARRY HEADS FOR THE
 RING CITY
CASINO.  LEO DRACONE, THE CASINO OWNER, IS THERE WITH HIS
ARMADILLAN BODYGUARD.";
425 PRINT".. A LARGE, HUMANOID HULK WITH GRAY,
ARMOR-LIKE SKIN.
430 PRINT"SINCE DRACONE HAS REPORTEDLY BEEN LINKED TO K.R.U.E.L.

(KIDNAPPING, REVOLT, USURPATION, EXTORTION LEAGUE), HARRY
WONDERS WHETHER TO RISK SHOOTING A HOMER DART INTO THE HEEL OF
THE CASINO OWNER'S SHOE.  ";
440 PRINT"IF HE HITS IT, HE WILL BE ABLE TO
MONITOR DRACONE'S MOVEMENTS.  IF HE MISSES AND DRACONE FEELS
THE DART, THEY WILL BE ALERTED TO HIS PRESENCE.
450 PRINT@H,H$;:GOSUB30
460 PRINT@W,W$
470 PRINT@320,"1)  FIRE THE DART
2)  DON'T FIRE THE DART
3)  WAIT TO FIRE THE DART LATER IN A LESS PUBLIC PLACE
480 PRINT@E,E$;:INPUTN
490 CLS:IFN<1ORN>3THEN480
500 ONNGOTO510,520,530
510 PRINT@465,"THE DART HITS PERFECTLY.":D$="D":GOSUB40:GOTO540
520 PRINT@460,"HARRY FORGETS ABOUT USING THE DART.":GOSUB40:GOTO
540
530 PRINT@P,"UNFORTUNATELY, HARRY DOESN'T GET ANOTHER OPPORTUNIT
Y
TO FIRE THE DART.":PRINT@H,H$;:GOSUB30
540 CLS:PRINT@320,"HARRY FEELS A TAP ON HIS SHOULDER AND TURNS T
O SEE A BEAUTIFUL
BLOND WOMAN IN A RED PLASTO-MOLD JUMPSUIT.

SHE SMILES AND SAYS,  ' HELLO HANDSOME ! '
550 PRINT@H,H$;:GOSUB30
560 PRINT@P,"' WELL HELLO, '  HARRY ANSWERS,  ' AND WHAT'S YOUR
NAME? '":PRINT@H,H$;:GOSUB30
570 PRINT@P,"' I'M HONI POTT.  I WORK HERE.  YOU'RE NEW ON PILA,
 AREN'T YOU?
WOULD YOU LIKE ME TO SHOW YOU AROUND? '":PRINT@H,H$;:GOSUB30:CLS

500 PRINT@P,"MUCH TO HIS REGRET, HARRY FINDS HIMSELF SAYING,

        ' SORRY HONI, MAYBE SOME OTHER TIME. '

THEN HE LEAVES THE CASINO.":PRINT@H,H$;:GOSUB30
590 CLS:PRINT@W,W$
600 PRINT@320,"1)  CHECK OUT THE PILA OBSERVATION DOME
```

Program continues

BT ENTERPRISES

presents . . .

COMMUNICATION SOFTWARE

UNITERM

Communicate with other computer owners as well as 'THE BIG BOYS' from your TRS-80 Model I or III Computer. Full featured intelligent terminal program allows you to download and upload on your favorite system. Auto-logon, auto polling, connect and signon messages all supported! Available with NEWDOS/80 command support also (UNITERM/80)!

UNITERM ..... (113000).$79.95
UNITERM/80 ..... (113080).$89.95

CONNECTION — 80

Run your own Bulletin Board on your TRS-80 Model I or III. A full feature BBS with over 100 in use throughout the country, Canada, Mexico and Europe! Package is easy to operate and needs only an auto-answer modem. and 2 disk drives (an RS232-C board may also be needed). For complete details, call the modem number below which is the HQ system for CONNECTION-80.

Connection-80 (I) ..... (101000).....$199.95
Connection-80 (III) ..... (103000).....$199.95

ELECTRONIC MESSENGER

Connect yourself with your friend, office, branch, or other remote site with the ELECTRONIC MESSENGER! This is a full featured Electronic Mail Package for your TRS-80 Model III computer. Allows you to compose messages on your computer and either leave them for retrieval by another unit, or SEND THEM AUTOMATICALLY AT A PRESET TIME!!! Just think of the possibilities .....
First copy ..... (103013) $149.95
Additional copies ..... (103014)..... $ 89.95

Available At:

Micro-Computer Business
3111 Juneau Place
Baltimore, Md. 21214
301-426-6803

80 MicroComputing Services
158 Remsen Street
Cohoes, N.Y. 12047
518-235-9004

Computer Services of Danbury
1 Franklin Street
Danbury, Ct. 06810
203-743-1299

Eberts Personal Computers
4122 South Parker Ave.
Aurora, Co. 80014
303-693-8400

Inflo, Inc.
Rt. #1 Box 244 Mill Road
Yaphank, N.Y. 11980
516-924-5179

Maxi-BYTE Computer Shoppe
999 Middle Country Road
Middle Island, N.Y. 11953
516-924-7722

Micro Images
146-03 25th Road
Flushing, N.Y. 11354
212-445-7124

BT ENTERPRISES

171 Hawkins Rd.
Centereach, N.Y. 11720
(516) 981-8568 (voice)
(516) 588-5638 (modem)

Dealer Inquiries Welcome
N.Y.S. Residents Add Tax
Add $5 shipping — handling
Prices subject to change

MasterCard VISA WELCOME

300

See List of Advertisers on page 338

The Lawyer's Microcomputer™

A Newsletter for Lawyers Using the TRS-80*

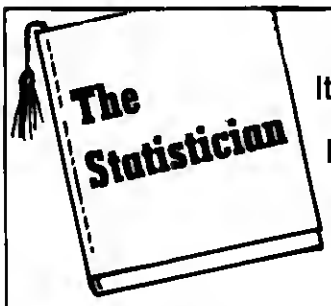
- Articles for Lawyers
- Law Office Applications
- Lawyer Information Exchange
- Software Reviews
- Hardware Reviews
- Advertisements Directed to Lawyer Users
- Technical Tips
- Letters and Suggestions
- And Much More

A New Monthly Newsletter For Lawyers

Send $28 For A One Year Subscription

The Lawyer's Microcomputer™
Post Office Box 1046A
Lexington, S.C. 29072

191 *TM Tandy Corp



First in Its Class and Looking for Work.

TRS-80 Model I, II, III

Five multiple regression procedures (including stepwise, backward elimination, all subset, and ridge), 24 transformations, comprehensive data base manager (with search and sort), descriptive statistics, hypothesis testing (7 tests), time series analysis (7 models), random variate generation, discrete probability distributions, sampling distributions, nonparametrics (5 tests), and complete documentation.

Complete package with manuel — $125
To order, send payment plus $2.00 shipping and handling to:

Quant Systems
P.O. Box 628
Charleston, S.C. 29402
803-571-2825
194

S.C. residents add 4% sales tax
Overseas orders add $7 for shipping

Program continued

```
2)  TRY TO FIND THE MISSING PLUTONIUM
3)  GAMBLE IN THE CASINO
4)  GET A DRINK AT THE BAR
5)  GO BACK TO HONI POTT
610 PRINT@E,E$;:INPUTN
620 CLS:IFN<1ORN>5THEN610
630 ONNGOTO640,690,700,700,710
640 PRINT@128,"AT THE DOME HARRY WATCHES SHIPS GO THROUGH THE ST
ARGATE":

                PRINTW$:PRINT"1)  STAY IN THE DOME AND LOOK FOR
CLUES
2)  EXPLORE MORE OF THE CITY"
650 PRINT@E,E$;:INPUTN
660 CLS:IFN<1ORN>2THEN650
670 ONNGOTO680,690
680 CLS:PRINT@463,"HARRY HAS WASTED TOO MUCH TIME.":GOSUB40:GOTO
5010
690 PRINT@465,"HARRY EXPLORES PILA.":GOSUB40:CLS:GOTO870
700 CLS:PRINT@P,"SEEMS LIKE HARRY HAS GOTTEN CAUGHT UP IN THE  '
 FUN AND GOOD
TIMES '  SPIRIT OF THE RING CITY AND LOST SIGHT OF HIS MAIN
OBJECTIVE.":PRINT@H,H$;:GOSUB30:GOTO5010
710 PRINT@384,"HARRY DECIDES THAT HONI MIGHT BE HELPFUL.  SHE IS
 HAPPY TO SEE
HIM AND ASKS WHERE HE WOULD LIKE TO GO ON PILA.":PRINT@N,N$;:GOS
UB30:PO$="PO":HU=0
720 CLS:NU=NU+1:IFNU>2THEN760ELSEPRINT@W,"WHERE SHOULD HE GO?
1)  OBSERVATION DOME
2)  ASTRO PARK
3)  ENTERTAINMENT COMPLEX
4)  LOADING DOCKS
5)  ALIEN ENVIRO-CENTER
6)  FUSION GENERATORS
7)  HONI'S APARTMENT
730 PRINT@E,E$;:INPUTN
740 CLS:IFN<1ORN>7THEN730
750 ONNGOTO770,771,772,790,773,700,774
760 CLS:PRINT@398,"HE FINDS NOTHING ON HIS TOUR.":GOSUB40:GOTO68
0
770 PRINT@P,"HARRY WATCHES AS SEVERAL SHIPS APPROACH AND CAREFUL
LY PASS
THROUGH THE STARGATE, BUT HE SEES NO TRACE OF THE MISSING
FREIGHTER.":GOTO775
771 PRINT@P,"THE PARK IS BEAUTIFUL UNDER THE ARTIFICIAL SUN, BUT
 HARRY FINDS
NO CLUES.":GOTO775
772 PRINT@P,"HARRY REALLY ENJOYS THIS PLACE, BUT BE FINDS NOTHIN
G AND TIME
IS QUICKLY RUNNING OUT.":GOTO775
773 PRINT@P,"HARRY AND HONI PEER AT STRANGE ALIEN LIFE FORMS THR
OUGH THICK
GLASS WALLS, BUT THERE IS NO ABNORMAL RADIATION HERE OR
ANYTHING ELSE THAT WOULD INDICATE THE PRESENCE OF THE MISSING
PLUTONIUM.":GOTO775
774 PRINT@P,"ALAS, HARRY HAS EVIDENTLY DECIDED THAT HIS PERSONAL
 OBJECTIVES
COME BEFORE HIS MISSION... A UNWISE CHOICE UNDER THE PRESENT
CIRCUMSTANCES.":PRINT@H,H$;:GOSUB30:GOTO5010
775 PRINT@H,H$;:GOSUB30:GOTO720
780 PRINT@P,"HARRY'S WRISTBAND TRICORDER DETECTS RADIATION...
BUT IT'S ONLY FROM THE FUSION GENERATORS.":PRINT@H,R$;:GOSUB30:G
OTO720
790 PRINT@P,"HARRY'S WRISTBAND TRICORDER PICKS UP RADIATION, BUT
 THE DOCKS
ARE HUGE AND CAVERNOUS.":PRINT@H,H$;:GOSUB30
800 PRINT@W,W$;:PRINT@320,"1)  CHECK OUT EACH WAREHOUSE
2)  ASK HONI
3)  USE THE TRICORDER
4)  CALL U.E.C. FOR ASSISTANCE
5)  SNOOP AROUND SOME MORE
810 PRINT@E,E$;:INPUTN
820 CLS:IFN<1ORN>5THEN810
830 ONNGOTO840,850,840,600,840
840 PRINT@P,"THERE ARE TOO MANY WAREHOUSING PODS TO EXPLORE.":PR
INT@H,H$;:GOSUB30:GOTO680
850 PRINT@192,"SINCE THE FREIGHTER WAS REPORTED MISSING ONLY YES
TERDAY, HARRY
ASKS HONI WHERE THE CARGO IS FIRST RECEIVED.  SHE POINTS TO THE
MASTER INVENTORY CONTROL CENTER.  HARRY EXCUSES HIMSELF AND
LEAVES HER.
860 PRINT@H,H$;:GOSUB30
870 PRINT@320,"USING HIS TRICORDER, HARRY LOCATES THE MISSING PL
UTONIUM
CONTAINERS; BUT THEY ARE EMPTY.  ONLY RESIDUAL RADIATION REMAINS
BEHIND.
```

Program continues

TEN PROGRAMS FOR $20

EVERYTHING YOU EVER WANTED
IN A PROGRAM — AND LESS!

INDIAN — Like arcades PACMAN Game
AIRCOM — Be an Air Traffic Controller
HORSE — Bet on the races
ADVENTURE — Get back to our time
TANK — Rage war on your computer

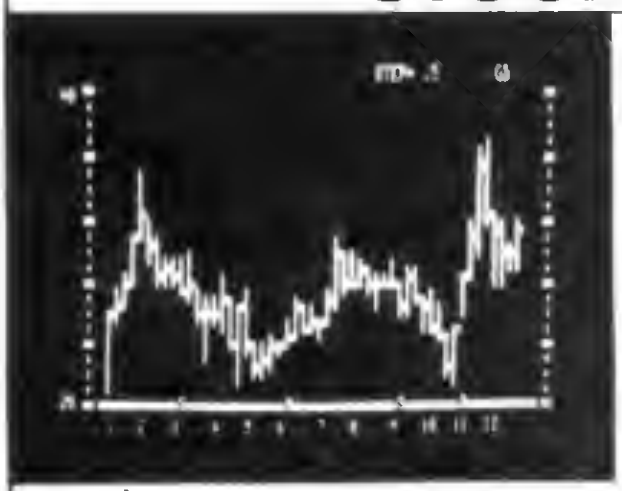
PLUS:
Word Processer, Cyborg Battle, Yahtzee AND MORE!
ALL FOR THE 16K L2 TRS-80

Tcorp ↙529
P.O. Box 800
Kennebunk, ME 04043
(207) 985-7780

COMING:
BUSINESS AND EDUCATION PACKAGES

ON CASSETTE
w/DOCUMENTATION—$20

"STOCK ANALYSIS SOFTWARE"
FOR THE TRS-80 I/III AND APPLE-II COMPUTERS
STOCKCHART-I™



- uses PROPRIETORY PRICE-TREND analysis technique to generate price-trend signals
- will generate price-charts with HIGH, LOW, and CLOSE stock prices
- EASY ENTRY FORMAT; requires less than 5 minutes to update 20 stocks

requires min. of 32K RAM, 1 DISK DRIVE
(APPLE II version requires 16 sector DOS)

Available now. . .

99.00

☐ TRS-80 I/III
☐ APPLE II
MC/VISA CHECK COD

Name _____
Addr _____
City _____
State _____ Zip _____
CHG# _____ _____
Exp. Date _____ Inter Bank ___
Signature _____

(Allow 4 weeks for delivery on personal check orders)

MICRO-INVESTMENT SOFTWARE
An Investment Software Company
9621 Bowie Way • Stockton, CA 95209
(209) 952-8833
(Not an investment advisory program)

STOCKCHART-I is a trademark of Micro-Investment Software
TRS-80, APPLE-II is a trademark of TANDY CORP. & APPLE Computer, respectively ↙111

↙See List of Advertisers on page 338

FINALLY

Your cassette based TRS-80* can handle data files!

RAMFILE is the answer. It will allow you to write BASIC programs that will efficiently store data in the Random Access Memory of your computer. You will be able to sort and selectively retrieve, update and delete the data and store it on tape for future use, at a speed and efficiency that you never thought possible. RAMFILE runs with 16K or larger Level II or Model III BASIC.

RAMFILE and demonstration BASIC program on cassette tape and manual. $59.95.

Postage paid in U.S.A. Foreign orders include $2.50. Ill. Residents include 5% sales tax.

Send orders to:

INDIVIDUAL SYSTEMS INC.
P.O. BOX 343
Downers Grove, Illinois 60515

*Trademark of Tandy Corp. ✓424

CCA DMS for TRS—80 MODEL II

New! Major enhancements to the highly rated CCA Data Management System are now available on TRS-80 Model II. Advanced features like custom screen layouts, relational searches, data calculations, indexing and data interchange with other systems are standard.

CCA DMS gives you unexcelled productivity aids for data entry, file re-formatting, and report generation. For instance, several different reports may be batched, and CCA DMS even automates TRSDOS multi-copy disk spooling.

CCA DMS offers unprecedented versatility and flexibility—up to 64 fields, and all may be indexed—any number of custom screen layouts or reports for each file—10 levels of sorting (Machine language of course!)

CCA DMS costs only $225.00. Order from:

F/S associates, inc.
micro data management development

F/S Associates - 1116-A 8th Street, Suite 121
Manhattan Beach, CA 90266. (213) 374-7544

Calif. Res. add 6½% Tax ✓392

* TRS—80 is a trademark of Tandy Corp

Program continued

```
800 PRINT@H,H$;:GOSUB30
890 PRINT@W,W$
900 PRINT@320,"1)  CALL U.E.C. AND REPORT WHAT HE FOUND
2)  KEEP LOOKING AROUND
910 PRINT@E,E$;:INPUTN
920 CLS:IFN<1ORN>2THEN910
930 ONNGOTO960,940
940 PRINT@P,"HARRY FINDS NOTHING.  HOURS HAVE PASSED":
INPUT"SHOULD HE KEEP LOOKING (Y/N)";O$
950 IFO$="Y"THEN600:IFQ$<>"N"THENCLS:GOTO940
960 PRINT@320,"HARRY RUNS TO HIS HOTEL ROOM TO TELL U.E.C. THAT
THE
PLUTONIUM IS ON PILA.  BUT BEFORE HE CAN CALL, HIS ROOM IS
JETTISONED INTO SPACE, AND A VOICE COMES OVER A SPEAKER.
IT IS LEO DRACONE.
965 PRINT@R,R$;:GOSUB30
970 PRINT@P,"' HELLO COMMANDER FLYNN.  SORRY TO HAVE EVICTED YOU
 SO
FORCEFULLY FROM PILA, BUT YOO WERE BECOMING MEDDLESOME. '":PRINT
@R,R$;:GOSUB30
980 PRINT@P,"' JUST WHAT DO YOU PLAN TO DO AT PILA, ' QUESTIONED
 BARRY.":PRINT@R,R$;:GOSUB30
990 PRINT@192,"' QUITE SIMPLE COMMANDER.  WITH THE PILA STARGATE
 GONE, THE ONLYMEANS OF TRADE WITH ANDROMEDA WILL BE THROUGH A N
EW
GATE WHICH WE HAVE DISCOVERED.  K.R.U.E.L. WILL CONTROL ALL
INTER-GALAXY TRANSPORTATION.";
1000 PRINT"  IT WILL BE WORTH BILLIONS OF
GALACTIC CREDITS ANNUALLY.
I MUST LEAVE YOU NOW AND MAKE FINAL PREPARATIONS FOR THE
UNPORTUNATE CATASTROPHE WHICH IS ABOUT TO TAKE PLACE.
1005 PRINT:PRINT"I ESTIMATE YOU HAVE ABOUT 10 MINUTES OF AIR LEF
T IN YOUR ROOM.

GOOD BYE, COMMANDER. '
1010 PRINT@R,R$;:GOSUB30
1020 PRINT@W,W$
1030 PRINT@320,"1)  RADIO FOR HELP
2)  LEAVE THE ROOM POD
3)  TRY TO FLY THE POD
4)  BREATHE SLOWER
5)  WAIT TO BE RESCUED
1040 PRINT@E,E$;:INPUTN
1050 CLS:IFN<1ORN>5THEN1040
1060 ONNGOTO1070,1080,1090,1100,1110
1070 PRINT@P,"THE RADIO NO LONGER FUNCTIONS!":GOSUB40:GOTO5000
1080 PRINT@470,"ARE YOU  C R A Z Y !":GOSUB40:GOTO5000
1090 PRINT@P,"HAVE YOU EVER TRIED TO FLY A HOTEL ROOM?":GOSUB40:
GOTO5000
1100 PRINT@P,"THIS GIVES HIM 5 MORE MINUTES... BEFORE HE DIES.":
GOSUB40:GOTO5000
1110 IFPO$="PO"THEN1120ELSEPRINT@460,"HARRY HAS NO FRIENDS ON PI
LA TO RESCUE HIM.":PRINT@R,R$;:GOSUB30:GOTO5000
1120 PRINT@256,"IT'S A GOOD THING HARRY MADE FRIENDS WITH HONI.
 SHE WAS ON HER
WAY TO HIS ROOM WHEN IT WAS JETTISONED.  SHE PICKS HIM UP IN A
SERVICE SHUTTLE.
ONCE ABOARD THE SHIP, HARRY SPEEDS BACK TO PILA.
1130 PRINT"HE MUST STOP DRACONE FROM SETTING THE BOMBS AND MAKIN
G GOOD HIS
ESCAPE.":PRINT@H,H$;:GOSUB30
1140 IFO$="O"THEN1150ELSEPRINT@P,"BUT PILA IS A BIG PLACE WITH S
HIPS ARRIVING AND DEPARTING
CONTINUOUSLY:
HARRY CAN'T FIND DRACONE IN TIME.":PRINT@H,H$;:GOSUB30:GOTO5010
1150 PRINT@P,"LUCKILY, THE HOMER DART IN DRACONE'S SHOE IS STILL
 WORKING.
AS SOON AS HE DOCKS, HARRY SETS OUT AFTER HIM.":PRINT@R,R$;:GOSU
B30
1160 PRINT@P,"BUT OUT OF THE SHADOWS LEAPS THE ARMADILLAN.  HE G
RABS HARRY IN
A CRUSHING, VICE-LIKE GRIP!!!":PRINT@R,R$;:GOSUB30:AR=0
1170 CLS:AR=AR+1:IFAR>2THEN1215ELSEPRINT@W,W$
1180 PRINT@320,"1)  USE KARATE
2)  BITE HIM
3)  CRY FOR HELP
4)  BREAK FREE
5)  SOCK HIM
6)  STEP ON HIS FOOT
7)  TRY TO BRIBE HIM
0)  PRETEND TO FAINT
1190 PRINT@E,E$;:INPUTN
1200 CLS:IFN<1ORN>0THEN1190
1210 ONNGOTO1220,1220,1220,1220,1230,1220,1220,1220
1215 CLS:PRINT@396,"HARRY HAS RUN OUT OF CHANCES.
```

Program continues

turer might take. It also helps to conserve memory by making it easy to identify when different actions can branch to and use the same program routine.

With your outline and flowcharts in hand you should have a good idea of what is going to happen in the program including the introduction, decisions and finale. To see how all these parts fit together, let's go through Assignment 46's listing.

Line 20 sets the variables H=982 and H$="Hit '/' Key". Setting often used variables will save typing and conserve memory.

The subroutine in line 30 allows the adventurer to read the text on the screen at his own rate and then clear it for the next bit of narrative. Again, we save time and memory by calling on the same subroutine throughout the program.

Instead of setting up a delay loop each time we need one, the routine in line 40 is called up repeatedly. Lines 50–100 set the stage for the adventure and line 110 starts the main narrative portion of the program. By mentioning the laser ring here, a subtle clue is given as to what Commander Flynn will need later on. Lines 120–170 explain the mission.

Line 175 is important to understand. Flags are set at several places in the program. Program execution routes change depending on the value certain variables have been given during the operation of the program. If the adventurer selects option 1, then variable X might be given a value of five, whereas if option 2 is chosen, X may be set equal to 10. Later in the program, the action of the adventure will be different depending on what the value of X is at that point. In Level II Basic, when one goes from the command mode to the execute mode by typing Run, all numeric variables are set to zero and all string variables are set to null. But in this program, if the adventurer fails his mission and wants to start over, he does not have to type Run. All he has to do is type a Y when asked if he wants to try again. If yes, program operation will resume at line 175. All variables will carry over the values from the previous game to the new game. Obviously, a new game requires new variables and by starting line 175 with the Clear command, we are assured of beginning the new adventure with a clean slate.

Why not let the program end when the current game is over? You could require that Run be typed each time the adventure is played. I feel that going all the way back to line 175 is penalty enough without having the player sit through the program introduction over and over again. The rest of line 175 sets the variables to be used throughout the balance of the program. It is necessary to reset H and H$ since the Clear command would have reinitialized them also.

Lines 180–200 provide the connecting narrative to the first decision branching point called D1.

The flowchart for D1 (Fig. 1) explains the choices available to the adventurer and the results of each action as written in lines

COMPUTER SHACK

–SUPER DIRECTORY–

– Automatic density recognition ● Automatic track count recognition –
– Automatic dos recognition ● The Best Directory On The Market! –
– By Mark Feldman –

This will be the standard which all other Directories are judged. It will read any normal type of diskette Mod I or III, Multi Dos, Ldos, Dos Plus, and Trs Dos. Double Density, Single Density, 35, 40 or 80 track drives.

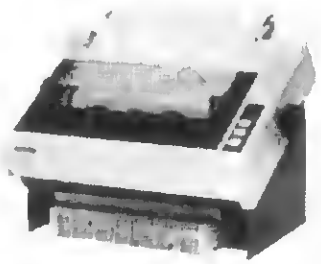
A machine language program that is easy to use, but at the same time has all the features you will ever need. Display to screen or to printer. Displays by program, or disk, or subject. Super fast sort. Scrolling displays, ect.

You can even add a line to help tell what the program is about.

SUPER DIRECTORY.....$39.95

SPECIAL OFFER - with each Super Directory ordered at $39.95 you will receive 10% discount on any disks ordered at the same time.

SPACE AGE PRINTER STANDS
3/16 X 9.375 X 13.5 X 8 PLEXIGLAS
CLEAR $27.50 COLOR $29.95



Small Business Programs

CHECKING ACCOUNT Mod 1 or III 48k disk $39.00
Excellent check writing program for small business. Prints checks on printer sorts into 32 catagories for bookeeper and IRS

BILLING SYSTEM Mod I or III 48k disk $39.00
Excellent system for the small business man. It is fast and easy to use. Prints out invoice and monthly bills. Adds interest etc

SPECIAL ANY TWO SMALL BUSINESS PROGRAMS $65.00

INVOICE PROGRAMS
Prints out invoice with your name at the top on 8½ X 11 paper or on NEBS forms
ONLY **$24.95**

EP-SET-80

If you have a EPSON Printer you need EP-Set. A series of programs that help you use all the features of the Epson printer. One merges with a basic program to help drive the printer. One is a machine language subroutine to give your keyboard access to the printer (example: type control c to get the compressed mode. Control E to get emphasized characters). Use EP-SET to set the line spacing, character modes, strike modes etc. Throw your manual away. Happiness is here with EP-SET
Disk or Tape **$18.95**

FAMILY TREE

Excellent family genelogy program works on both the model I and III. Written especially for the person just getting into genelogy. It has over 250 pages of instructions on how to research your family tree, how to get information and how to put it into the program
Disk or Tape **$29.00**

Miscellaneous Utilities

Z BASIC
The only Compiler we will recommend

Disk & Tape together	$94.95
Disk	$84.95
Tape	$74.95

MYSOS EDAS 35
Our favorite editor assembler **$74.95**

SUPER UTILITY PLUS	**$44.95**
POWER DRAW	**$34.95**

V F U
By Vernon Hestor valuable File Utility Purge-Execute -Copy by file or disk
Specify Operating System **$19.95**

TAPE COPY II **$12.95**
Only $5.00 with any other utility

MULTI DOS

We well them all - We recommend and use **MULTI DOS** - Don't let its low price fool you. It'll do everything the others will and quite a few things they can't.
MULTIDOS has the BEST BASIC - it's the EASIEST to use and its the FASTEST system around. Why pay twice as much for a operating system that's complicated and hard to use

MULIT DOS.....$76.95

SPECIALS

MULTI DOS with Aerocomp Doubler	$209.95
MULTI DOS with Super Directory	$99.95
MULTI DOS with Super D & Doubler	$229.95
DOS PLUS 3.4	$129.95
L DOS	$119.95
AEROCOMP DOUBLER	**$139.95**

COMPUTER SHACK

1691 Easton ● Pontiac, Michigan 48054
Information (313) 673-2224 Orders 1-800-392-8081
[illegible]
DEALERS [illegible]

See List of Advertisers on page 338

GRAPHICS

Grafpac-80 is an easy to use universal Graphics program designed to drive any dot addressable Crt, printer, plotter. Grafpac-80 takes it's data from your disk files and is usable from: Basic, Fortran Pascal, Fourth, Cobol, etc.

Grafpac-80 has these features:

- Circle, Elipse, Sector, Arc
- Line Relative and Absolute
- 2D and 3D Cordinate Systems
- Character Generation with 360 degrees rotation and size control.
- Over 15 additional commands
- Pie, Bar, Scatter and X, Y Plots
- Maps of the USA and the World
- Various Pictures

Grafpac-80 is available for: TRS-80 Model 1, 2 with 48K and disk, CP/M systems with 48K. Versions already configured for: Epson MX-80 with Graftrax, Calcomp 565 x,y plotter, Matrox ALT 512 S100 Graphics board.
TRS-80, $29.95 CP/M, $59.95

Call or write:

M.E.S.C.
Parkhurst Drive
Salisbury, MD 21801
301-742-7333 393

MOD III SOFTWARE

Finally the same software for MOD III as the CP/M boys.
We have taken the same packages and converted to MOD III

1. GENERAL LEDGER
2. ACCOUNTS RECEIVABLE
3. ACCOUNTS PAYABLES

US $250. per Module.

Creative Software

445 [illegible] AVENUE
[illegible] B.C.
CANADA V [illegible] 1M3
604 [illegible]

Send for our full line catalogue

Program continued

```
      BE DOESN'T GET PASSED THE POWERFUL ARMADILLAN.":PRINT@H,H
$;:GOSUB30:GOTO5000
1220 PRINT@P,"SUCH ACTION IS USELESS WHEN FIGHTING AN ARMADILLAN
.":PRINT@H,H$;:GOSUB30:GOTO1170
1230 PRINT@P,"HARRY JABS AT THE CREATURE'S JAW.  HIS LASER RING
FLASHES A
RUBY RED PULSE, AND THE ARMADILLAH FALLS TO THE FLOOR.":PRINT@H,
H$;:GOSUB30
1240 PRINT@256,"HARRY FINDS DRACONE IN A LARGE AIR LOCK WITH A D
OZEN GUARDS.
THEY ARE STUDYING A LARGE CHART SHOWING THE PILA AIR HANDLING
SYSTEM WITHIN WHICH DRACONE HAS HIDDEN THE BOMBS.":PRINT@H,H$;:G
OSUB30
1250 CLS:PRINT@W,W$
1260 PRINT@320,"1)  CALL FOR HELP
2)  BLAST THEM WITH HIS LASER
3)  EXAMINE THE AIR LOCK
4)  USE A MINI-NUKE SHIRT BOTTON GRENADE TO BLOW THEM OUT
1270 PRINT@E,E$;:INPUTN
1280 CLS:IFN<1ORN>4THEN1270
1290 ONNGOTO1300,1310,1330,1320
1300 PRINT@P,"IT'S TOO LATE FOR THAT.":GOSUB40:GOTO1250
1310 PRINT@P,"THERE'S TOO MANY OF THEM.  YOU LOSE.":PRINT@H,H$;:
GOSUB30:GOTO5000
1320 PRINT@P,"THE GRENADE IS TOO POWERFUL.  IT BLOWS OUT A SECTI
ON OF THE
CITY AND THEN SETS OFF DRACONE'S BOMBS.":PRINT@H,H$;:GOSUB30:GOT
O5000
1330 PRINT@P,"HARRY FINDS THE AIR LOCK CONTROLS, SHUTS THE INNER
 DOORS, AND
PUMPS OUT THE AIR UNTIL EVERYONE IN THE CHAMBER PASSES OUT.  HE
THEN STARTS TO CALL U.E.C. TO HAVE DRACONE AND HIS MEN PICKED UP
WHEN  **  B O O M !  ** . . ."
1335 PRINT@H,H$;:GOSUB30
1340 PRINT@P,"HARRY LOOKED THROUGH THE AIR LOCK WINDOW.  DRACONE
 HAD BEEN
WEARING AN ENVIRONMENTAL SUIT, AND HE BLASTED A HOLE IN THE
OUTSIDE WALL KILLING HIS GUARDS BUT GAINING HIS OWN FREEDOM.
HARRY WAS FURIOUS.":PRINT@H,H$;:GOSUB30
1350 PRINT@W,W$
1360 PRINT@320,"1)  GET AN ENVIRONMENTAL SUIT AND GO AFTER HIM
2)  GET A SHIP AND GO AFTER HIM
3)  SEE IF THE HOMER DART IS STILL TRANSMITTING
1370 PRINT@E,E$;:INPUTN
1380 CLS:IFN<1ORN>3THEN1370
1390 ONNGOTO1400,1405,1410
1400 PRINT@P,"TOO MUCH TIME IS LOST WHILE HARRY TRIES TO FIND A
SUIT.  DRACONEGETS AWAY.":PRINT@H,H$;:GOSUB30:GOTO5010
1405 PRINT@P,"HARRY WASTES TOO MUCH TIME TRYING TO GET A SHIP.
DRACONE GETS
AWAY.":PRINT@H,H$;:GOSUB30:GOTO5010
1410 PRINT@320,"HARRY PICKS UP THE SIGNAL.  IT LEADS TO THE EXEC
UTIVE SUITE
ABOVE THE CASINO.  LASER GUN IN HAND, HARRY KICKS OPEN THE DOOR
AND FINDS IN THE MIDDLE OF THE ROOM...":PRINT@H,H$;:GOSUB30
1420 PRINT@214,"DRACONE'S SHOES!
SUDDENLY THE LIGHTS GO OUT AS HARRY IS STRUCK FROM BEHIND.
DRACONE RUNS TO THE LAUNCH BAY AND CLIMBS INTO HIS PRIVATE
SHUTTLE.
1430 PRINT"HARRY STAGGERS TO HIS FEET AND RUNS DOWN THE CORRIOOR
 AFTER
HIM.  AS DRACONE'S SHIP LEAVES THE BAY, HARRY FIRES SEVERAL
QUICK BURSTS.  ONE TEARS INTO THE SHUTTLE'S STABILIZER UNIT.
1440 PRINT"THE SHIP BUCKS ONCE, THEN AGAIN.  PEOPLE IN THE
OBSERVATION DOME SCREAM AS THEY SEE THE SHIP ENTER THE STARGATE
AT THE WRONG ANGLE.  IN AN INSTANT, THE SHIP VANISHES, LOST
FOREVER SOMEWHERE IN THE FABRIC OF SPACE AND TIME."
1450 PRINT@H,H$;:GOSUB30
1460 PRINT@400,CHR$(23)"CONGRATULATIONS":PRINT@524,"MISSION ACCO
MPLISHED !":FORT=1TO3000:NEXT:END
5000 CLS:PRINT@470,"GOOD BYE HARRY !":PRINT@H,H$;:GOSUB30
5010 CLS:PRINT@260,CHR$(23)"THE MISSION IS A FAILURE.

PILA HAS BEEN BLOWN TO ATOMS,

            AND

THE STARGATE IS LOST FOREVER.
5020 PRINT@978,H$;:GOSUB30
5030 CLS:PRINT@460,"WANT TO TRY AGAIN (Y/N)";
5040 INPUTD$:CLS:IFD$="Y"THENGOTO175
5050 IFD$="N"THEN5070
5060 IFD$<>"Y"ANDD$<>"N"THENCLS:PRINT@464,"ANSWER ONLY WITH Y OR
 N.":GOTO5040
5070 PRINT@456,"NOW THE FORCES OF K.R.U.E.L. WILL TRIUMPH UNOPPO
SED !":PRINT:PRINT
```

210–410. Face to face with a venomous Trilizard, the player selects his response from a list of six possibilities. In this case, only one of the choices will allow the adventurer to escape with his life. If number three is selected, the player finds himself confronted with two new possible actions plus the option of remaining still again. The flag L is incremented each time the player elects to remain still. If the adventurer chooses to remain still too long, the lizard gets tired of waiting for him to make a move and bites him anyway.

In the end, however, there are only two ways out of the D1 confrontation: kill the lizard and go on to D2, or die and go to End 1. End 1 is that part of the finale that signals that the adventurer has died as well as failed his mission. In End 2 the player also fails his mission, but remains alive and has the chance to fight another day.

Lines 420–450 contain the connecting narrative setting the stage for D2.

Lines 460–530 and the flowchart (Fig. 2) for D2 is very simple. The player is given three choices: fire the dart, don't fire the dart or wait to fire the dart. All three choices allow the program to proceed on to D3 as if nothing important has happened. If the first choice is selected and the dart is fired, the variable D$ is set equal to "D". The player will not realize until much later that if he did not fire the dart, he made a crucial error.

At lines 540–580 Honi Pott, the beautiful blond in a red plasto-mold jumpsuit, is introduced. At first she appears to be a pleasant distraction. Later, Commander Flynn will discover that not only the mission, but his very life depend on her.

Lines 590–700 explain D3 (Fig. 3) which is especially important to the rest of the adventure. Our hero can dally too long in the observation dome, or get distracted by the attractions of the casino or bar. If these choices are selected, the results of the adventurer's action are soon apparent. This is not true for two other possible choices. If option 2 is selected, the program will appear to proceed normally, but later the adventurer will come to a tragic end. Only if option 5 is chosen will PO$ = "PO". Giving the variable this value allows Honi Pott to come to Harry's rescue later in D7.

In D4 (Fig. 4 and program lines 710–780), the adventurer is given two chances to pick the right location in which to find clues. Then variable NU in line 720 exceeds two and the program branches to line 760. The player has wasted too much time looking in the wrong locations and fails the mission. In one cse, the selection of a visit to Honi's apartment, option 7, it is fairly obvious the player has the wrong objective on his mind and, therefore, is not given a second chance to pick another location to visit.

The flowchart in Fig. 5 shows the options available to the player at lines 790–860. Notice, in the lower right hand corner, that if the wrong decision was made back in D3, the program will branch down to this point skipping both D4 and D5. This is one of those transparent mistakes the player

COMPUTER SHACK

★ COLOR TAPE COPY ★

This tape will copy any tape machine language, basic or data files on the color computer. Only $15.95

COLOR SCARFMAN

New 4K Color Scarfman Tape... $19.50

MASTER CONTROL

For Color Computer only..... $19.95

COLOR BONANZA

Special Price!

50 Programs from SoftSector $39.95

NEW

INTRODUCTORY PRICE

FLIPPY DISKS - DOUBLE DENSITY $29.95

Wabash has been making Computer disks and tapas since 1965. One of the largest manufactures in the U.S. Wabash is the first major company to announce a quality flippy disk. All Wabash disks are tested on every track (flippy is test on all 40 tracks both sides) and guaranteed for 2 years against defects.

5¼ single density $25.95
Double density 80 track $34.99
Double density 80 track 2 sides ... $42.99
Flippy double density 2 or more boxes $29.95
Double density 40 track $32.99
Double density 40 track 2 sides ... $34.99
Flippy double density $35.99

HAYES SMART MODEM $239.95

DISK DOWNLOAD SYSTEM (DDS) / TAPE DOWNLOAD SYSTEM (TDS)

Having looked at all the terminal programs on the market. We at Computer Shack decided this was the best here is a partial list of the things it can do Ability to download and upload machine language, basic and text files with no conversion, and save them on tape or disk. All ASCII control codes can be generated from your keyboard with no hardware modifiction An online libraryt of system locations and phone numbers (updated by you) that can be referenced at any time (DDS only) Ability to transmit an auto logon message up to 64 characters in length
Full parallel printer support Full access to all BASIC and DISK commands while in terminal mode at the touch of a key Ten user definable control keys Prompt mode transmission capability Support of auto-dial routines for current popular modems featuring auto dial capability (DDS only) Full support of Videotext standards This all adds up to the greatest modem program on the market at any price Write for complete details
DDS (Disk) $75.95 TDS (Tape) $39.95 TRS-80 Model I or III

Direct File Transfer (DFT)

Direct File Transfer (DFT) is a modem prorgam which will handle the direct uploading and downloading of machine language and basic programs directly from disk to disk. It is the program you must have to download from any Bullet 80 system DDS will also download from the Bullet 80 system as DFT is built into it. DFT also has a chat mode, and has software controlled half and/or full duplex. Disk version $24.95 Tape version $19.95 TRS-80 Model I or II A version for the Radio Shack Color Computer is coming soooo

DFT DOWNLOAD & BULLETIN BOARD

A new host system thats just super. Its faster then a bullet and more error free then a forum. Write for more details $149.95

MODEM GAMES

Play CHESS, CHECKERS, and OTHELLO over your modem with your friends' Each game features full graphics, sound, and a continuous chat mode permitting you to send messages and sounds. Games are for two players and can be played on one computer or over the modem on two computers All three games are on one program. Share the cost with a friend The program comes with 2 disks or 2 tapes Now will play on a 232 board modem or a commection type modem. 2 tapes or 2 disks with two sets of instructions $29.95

MINE FIELD

In mine field you set up a maze of mines that you will try to get thru to win, but if you hit a mine then its your friends turn to try. At the end of the game the maze you set up will be sent to your friend and his to you so you may view where you went right or wrong. To run this game you need at least 32k memory and a RS232 board type modem. You get two programs and two sets of instructions (one for you and one for your friend - Share the cost)
TRS-80 Model I or III 2 cassettes $34.95
2 Disks $39.95

COMPUTER SHACK

1691 Eason ● Pontiac, Michigan 48054

Information ..... (313) 673-2224 Orders 1-800-392-8681

DEALERS

See List of Advertisers on page 338

Scanned by Ira Goldklang - www.trs-80.com

Color Computer Programs From Star-Kits

SPELL 'N FIX — Essential for serious word processing! Finds and fixes spelling and typing mistakes fast. 20,000+ word dictionary can be expanded. Truly professional program. $69.29 for RS disk or cassette, $89.29 for Flex.

HUMBUG — The Ultimate Monitor has 37 commands to enter, examine, start, stop, even single-step machine language programs, and more. $39.95 on disk or cassette for 16K or 32K systems, $49.95 for 64K systems.

CHECK 'N TAX — Set of programs to balance checkbook and keep tax data on disk. $50.

REMOTERM — Allows using a terminal to give the Color Computer a full 24x80 display for serious users or remote operation $19.95.

LFPRINT — Permits use of a non-standard printer. $19.95.

NEWTALK — Voice output program to examine and check memory. $20.

SHRINK — Our fast version of Eliza. $15.

OXXO — Our fast version of Othello. $15.

CHECK 'N TAX requires 32K, all others 16K. We accept cash, check, COD, Visa or MC. NY State residents please include sales tax.

Star-Kits

P.O. Box 209—E
Mt. Kisco, N.Y. 10549
(914) 241-0287
✓432

ESTATE PLANNERS!

HAS ERTA GOTTEN YOU DOWN?

TIRED OF CRUNCHING NUMBERS?

LET E - PLAN DO IT FOR YOU.

QUICK CALCULATIONS FOR COMPLEX ESTATE PLANNING SITUATIONS FOR LESS THAN $200.00.

AVAILABLE FOR DISC VERSIONS OF OF MODELS I, II, AND III.

FOR MORE INFORMATION, WRITE TO:
E-PLAN LTD.
P.O. BOX 182
PENFIELD, NEW YORK
14526
✓434

makes but does not find out about until later. The error was exploring the city without having Honi Pott along.

Figure 6 (lines 890–950) graphically shows that in D6 the player may either report his findings to U.E.C. or keep looking around. But if he wastes too much time before reporting, he fails the mission.

In lines 960–1010 the villain explains his plot. Our unfortunate hero is in no condition to do anything about it unless he comes out of D7 alive.

It is obvious from looking at Fig. 7 and lines 1020–1120, that decision D7 can be a most frustrating experience for the adventurer. A player can select all of the available choices and still not escape from his jettisoned hotel room. Only if PO$ = "PO" will the adventurer be rescued. That will not happen unless Harry Flynn made friends

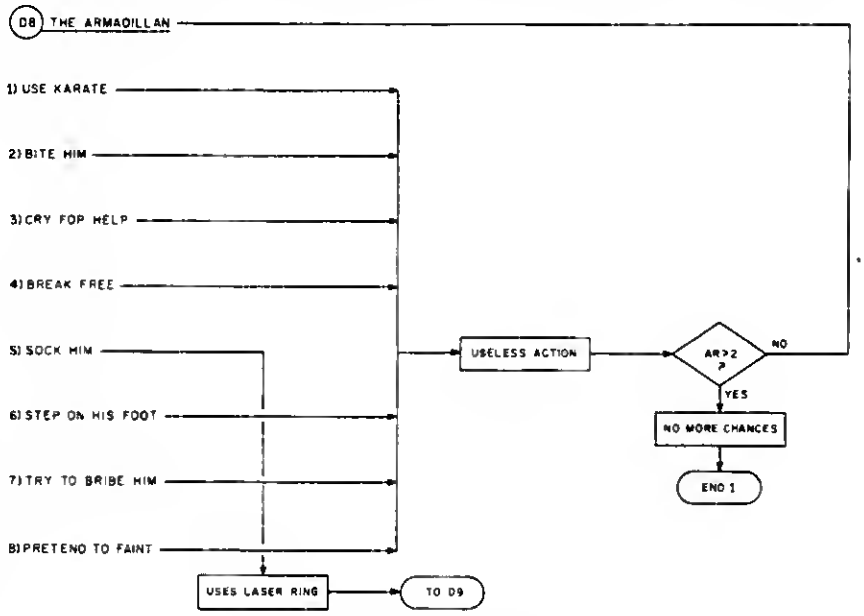


Fig. 8. D8—The Armadillan

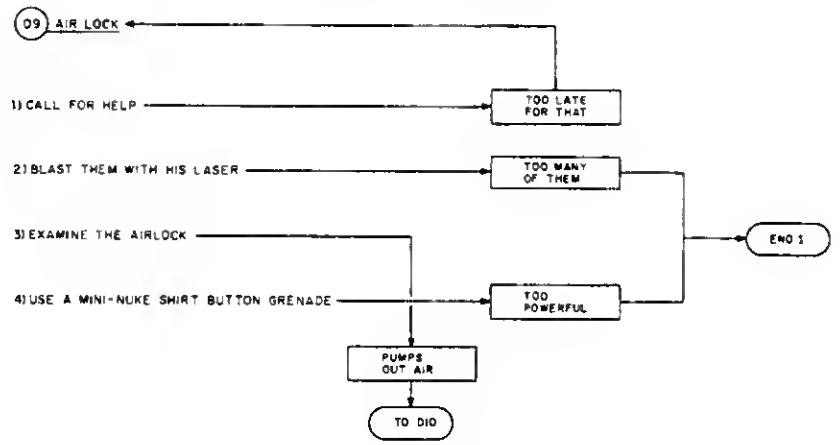


Fig. 9. D9—Air Lock

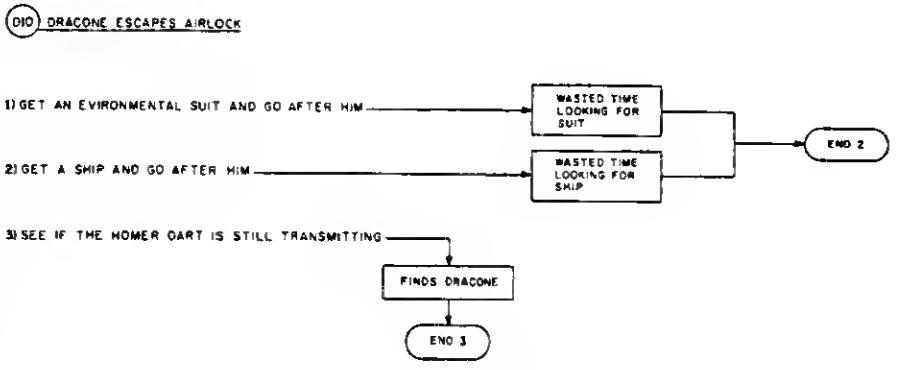


Fig. 10. D10—Dracone Escepes Airlock

with Honi Pott back in D3.

The adventurer may discover still another mistake he made earlier in the program at lines 1130–1150. If the homer dart was not tired when the opportunity was given, D$ will not equal "D" and the player will not be able to locate the villain in time to prevent the disaster.

Lines 1170–1230 and Fig. 8 again show the player with two chances to select the right action from a list of possibilities. The astute adventurer will remember Flynn's laser ring from the opening scene of the story.

In D9 the adventurer may call for help if he wants (lines 1250–1335). Although he is told he does not have time to get help, he is not penalized for seeking assistance. If, on the other hand, the adventurer is too bold and selects options 2 or 4, he perishes in a blaze of glory.

Lines 1350–1410 hold the last decision. D10 (Fig. 10) is relatively simple. At this point the narrative begins to take over as the excitement builds in the rush to the successful finale.

Lines 1420–1460 contain the narrative for ending three: the successful finish for "Mission Accomplished." Line 5000 is ending one: The adventurer dies. Line 5010–5020 is ending two: The adventurer lives, but he fails the mission.

Lines 5030–5070 give the adventurer an opportunity to try again. If he says yes, he goes to line 175. If he declines the opportunity, he is given a short scolding with the words "Now the forces of K.R.U.E.L. will triumph unopposed!"

A Word About Memory

It is easy to get carried away with fantastic illustrations when depicting the characters and surroundings in adventure games. The first time I wrote an adventure, I ran out of memory before I was three-quarters of the way through. So write colorfully, but conservatively.

As mentioned earlier, use subroutines wherever possible. Also note the absence of spaces. Your computer does not need spaces most of the time. They needlessly take up memory. Also, be careful about how many line numbers you use; each one takes up five bytes.

One last thing about memory usage—it changes. A program uses more memory as it is running: Additional memory is used during program operation by such things as setting a variable to a constant or allocating string space. Assignment 46 uses 68 more bytes of memory as it is being run. So leave yourself a little breathing room.

In Conclusion

I hope you enjoy this latest escapade of Harry Flynn and that this anatomy has been helpful to some budding adventurists. There is no substitute for experience, so start exploring the universe with your imagination and your computer. Then share your daring exploits with the rest of us. Good Luck! ■

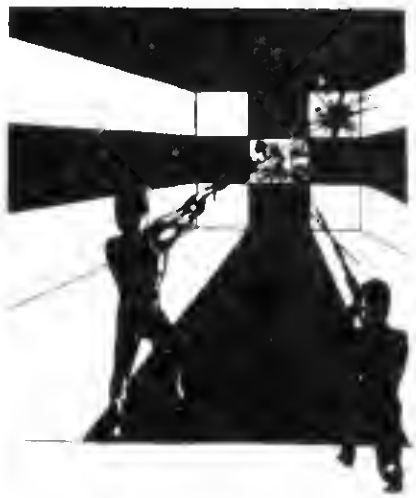
See List of Advertisers on page 338

COMPUTER SHACK

ALL GAMES AT DISCOUNT

10% off on one game
15% off on two games
20% off on three games
You must ask for discount at the time order is placed.

WAR ZONE



GREYMOON

AUGUST TOP TEN

1.) ALIEN DEFENSE	Softsector
2.) DEFENSE COMMAND	Big Five
3.) SCARFMAN	Big Five
4.) Tie COSMIC	Big Five
4.) Tie ELIMINATOR	Adventure In
6.) DUNGEON ESCAPE	Computer Shack
7.) ROBOT ATTACK	Big Five
8.) GREYMOON	Computer Shack
9.) ATTACK FORCE	Big Five
10.) SPACE INTRUDERS	Adventure In

We have a panel of expert game players who will give a monthly rating of the best games on the market. It will change monthly so look every month. If you would like to send in your top ten games we would be glad to have it.

SUPERMETER

The biggest problem in loading tapes has been the volume control. Prerecorded tapes are produced at differing volume levels. Now finally a device to let you set the correct volume levels for loading any tape. You will now load any tape the FIRST time. **SUPERMETER** plugs in (no cutting or soldering) between your tape recorder and the computer and lets you set the volume to the level that your computer wants.

SUPERMETER $29.00

Warzone

An exciting game only the smart survive. Graphics great sound and three levels of play.

Tape 15.95 Disk 19.95

GREYMOON

The newest and best version of the game that lets you be ruler of a country. Has sound routines. Very well written game. It's been in the top ten two of the last three months.

($15.95 / $19.95)

Alien Defense

Rated the #1 game three months in a row. Has the best graphics and fastest keyboard input of any game for the TRS-80.

($15.95 / $19.95)

FORTRESS (Softsector)	15.95/19.95
DEFENSE COMMAND (Big Five)	15.95/19.95
ROBOT ATTACK (Big Five)	15.95/19.95
SCARFMAN (Cornsoft)	15.95/19.95
ATTACK FORCE (Big Five)	15.95/19.95
COSMIC FIGHTER (Big Five)	15.95/19.95
LASER ATTACK (Med System)	15.95/19.95
SPACE CASTLE (Cornsoft)	15.95/19.95
80 SPACE RAIDERS	24.95/29.95
FORBIDDEN CITY	39.95
FORBIDDEN PLANET	39.95

COMPUTER SHACK

1691 Easton • Pontiac, Michigan 48054

Information (313) 673-2224 Orders 1-800-392-8881

GAME

LOAD 80

Two outdoor games from
The Wacky Wonderful World of Barry Adams

Outdoor Computer Games? Yep!

Barry Adams
109 Valley Place
Greenville, NC 27834

It's the right time for madness and mayhem in the great outdoors. Grab your TRS-80, a few friends, a dozen or so water pistols and a couple hundred two liter plastic soft drink containers and head for the back yard. No fooling, these are outdoors computer games.

Spy Versus Spy pits players against one another in a frantic wet contest with water pistols. The second program, Rendezvous, involves team play.

The object of Spy Versus Spy is to be the last player on the field. Players are eliminated when one opponent scores a legal hit with a wet blast from a water pistol. Players are assigned adversaries to eliminate by the computer.

The games are played in a maze of colored marker boundaries. Each player is assigned a color and a starting position by the computer. A hit can only be made when a player's assignment is on the pursuer's color. Movement, determined by the roll of three computerized dice, is accomplished by one of two methods. Each player can receive a dice roll or everyone can move the amount of each roll.

In Rendezvous, players are divided into spy teams of two members each. Initially, team members are unknown to each other. After locating one another, they must set up a base of operation on their assigned color. The computer assigns the same mission to all teams: to collect the most maze markers from a list compiled by the computer.

Spy teams can set traps, perform enforced expropriations and cut off travel routes by capturing mission markers. If a team's base marker is captured they are eliminated from the game. Teams which have been cut off can build bridges and resume play. The game is over when only one team remains or all of the mission

Program Listing 1. The Games

```
                MEMORY REQUIRMENTS*
WORK SPACE REQUIRMENTS                      - APPROX. 1400 BYTES MAXIMUM
PROGRAM WITH REMARKS AND LPRINTS            - APPROX 14,100 BYTES
PROGRAM WITH NO LPRINTS BUT WITH REMARKS    - APPROX. 13,800 BYTES
PROGRAM WITH LPRINTS BUT NO REMARKS         - APPROX. 13,400 BYTES
PROGRAM WITH NEITHER REMARKS NOR LPRINTS    - APPROX. 11,500 BYTES

 * PROGRAM CONSISTS OF LISTING + WORK SPACE

10 REM                    SPY VERSES SPY
20 REM
30 REM            FROM THE WONDERFUL WACKY WORLD
40 REM                       OF
50 REM                   BARRY L ADAMS
60 REM                 109 VALLY PLACE
70 REM               GREENVILLE, NC 27834
80 REM
90 '
                        PROGRAM SETUP
100 '
110 CLS:CLEAR 700:DEFINT A-Z:RANDOM
120 GOSUB 2280
130 PRINT:INPUT"ENTER THE NUMBER OF PLAYERS";T:IF T>14 THEN 1840 ELSE PRINT:T1=T
/2
140 DIM A(T),AC(T),C(7),M(T*3),P(166),PN(T),SP(T),TM(14),TP(T),AC$(T),AN$(T),I$(
16),M$(T),N$(12),PN$(T),R$(T),S$(1),T$(2),TM$(T/2),TP$(T)
150 FOR X=1 TO 12:READ N$(X):NEXT
160 FOR X=1 TO 9:READ C$(X):NEXT
170 FOR X=1 TO 16:READ I$(X):NEXT
180 S$(1)=" "I$(0)=" & "
190 T$(1)="TRAP":T$(2)="BRIDGE":T1$="RENDEZVOUS"
200 L1$=CHR$(27)+CHR$(14):L2$=STRING$(1,138)
210 CLS:PRINT@272,CHR$(23)"SPY VERSE SPY":PRINT
220 PRINT"PLEASE ENTER EACH PLAYER'S FIRST NAME":PRINT:PRINT"IN CASE OF SAME FIR
ST NAME":PRINT"ENTER FIRST LETTER OF THE LAST  NAME ALSO":PRINT
230 FOR X=1 TO T:PRINT@832,"ENTER PLAYER"CHR$(31)X"'S NAME";:INPUT PN$(X):PN(X)=
X:AN$(X)=N$(RND(12))+STR$(X):NEXT
240 '
                      MASTER PROGRAM MENU
250 '
260 GOSUB 2280:PRINT
270 PRINTTAB(4)"1  SPY CODE NUMBER ROSTER"
280 PRINTTAB(4)"2  PLAYER TURN SEQUENCE"
290 PRINTTAB(4)"3  SPY VERSES SPY"
300 PRINTTAB(4)"4  RENDEZVOUS"
310 GOSUB 2260:ON VAL(A$) GOTO 340,2400,380,1020
320 '
                    PLAYER CODE NUMBERS
330 '
340 CLS:PRINTTAB(16)"PLAYER CODE NUMBER ROSTER":FOR X=1 TO T:PRINT TAB(14)"NO."X
 TAB(34) PN$(X):NEXT X:GOSUB 2260:GOTO 260
350 '
************************************************************
360 '
                       SPY VERSE SPY
                        GAME  SETUP
370 '
************************************************************
380 GOSUB 2280:IF F=1 THEN 480
390 K=0:FOR X=1 TO T:A(X)=0:NEXT X
400 FOR X=1 TO 166:P(X)=0:NEXT
410 FOR X=1 TO T:PRINT@596,"WORKING"
420 AC$(X)=C$(RND(7))
430 A=RND(T):IF A<>X AND A(A)=0,M$(X)=PN$(A):A(A)=1:AC(X)=A:K=K+1 ELSE IF T-K=1
```

Listing 1 Continues

The Key Box

Model I or III
Basic Level II
32K RAM
Printer optional

markers have been captured. Then the team with the most markers is the winner.

TRS-80 In, Loonies Out

With the hot sun and all those water pistols it is better to leave the computer inside and keep the crazies and loonies out. The computer does play an integral part and it is necessary that the computer operator, who is the mission master, be able to see and easily converse with the players during play. At our home I move the computer to our screened-in back porch. Other possibilities include covered patios, tents and gazebos. Remember water is not your only enemy. The sun can be a problem as well, so choose a location that affords protection from both.

Setting Up

Both games can be played with up to fourteen players. You will need an equal number of water pistols. If water pistols don't appeal to you, try cans of whipped topping or shaving cream. Water balloons might seem a bit much, but on a muggy day they are just the thing.

Do not, of course, use anything that is harmful. Avoid dart guns regardless of how innocent they may appear, as well as anything else that shoots a projectile. Also, do not color the water with dyes or inks. While many colorings are safe to drink and eat, they may be dangerous in the eyes.

The field markers can be made from the black base of the two-liter plastic soft drink bottles. The bases can be removed by first removing the cap and then pinching the bottom of the thinner plastic. Grip the base and pull the two pieces apart. (In addition to game markers the bases also make excellent rooting pots for flowers.)

Ten marker colors are needed. The colors used are up to you. (I use blue, green, red, yellow, silver, white, light blue, light green, orange and black.) Household spray enamel works fine—the paint scratches but that is not a problem.

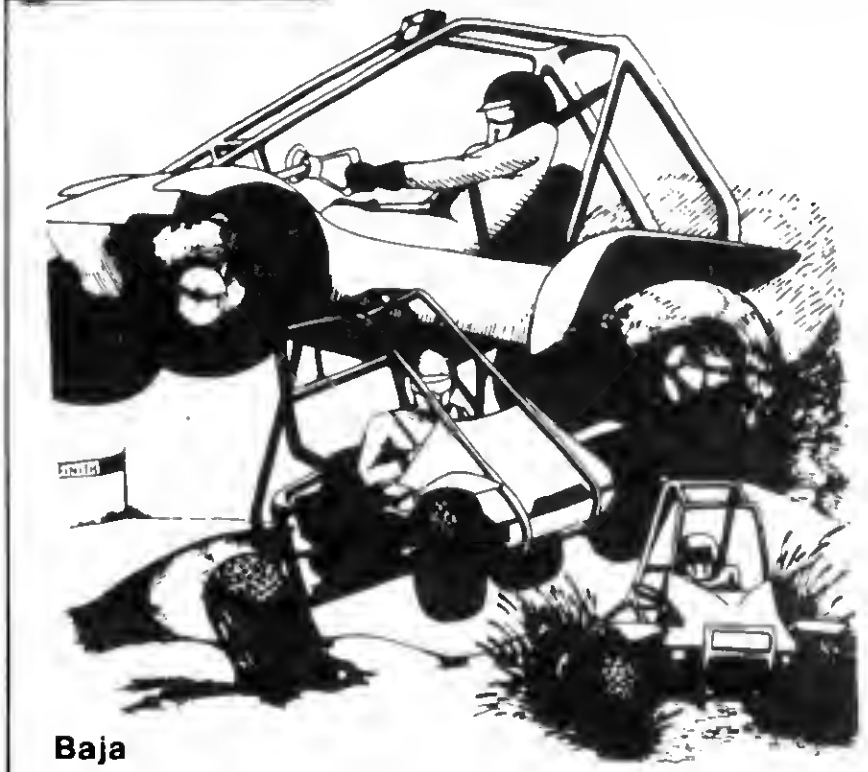
Three colors represent special purposes. In my color scheme orange colored markers are *turn* markers, light green markers represent *safe zones* and black markers are *bridges.*

With the exception of the special purpose markers, 21 markers of each color are required. Seven *turn* markers and nine *safe zone* markers are needed. The number you need for the other special purpose marker, the *bridge* marker, is not fixed. I recommend 10-20 of these. All markers, except the bridge markers, are given a number between 1 and 166. Assign the numbers randomly. (Be sure that no two markers receive the same number.) Write the numbers on the top with magic markers.

You might be wondering how to come up with 166 two-liter soft drink bottles. Buying them would be expensive, not to mention the strain on the kidneys.

I visited dumpsters at the apartment complexes. Of course there are drawbacks. My wife accompanied me only once. She

COMPUTER SHACK



Baja

A great new game with fast action, exciting graphics and excellent sound. Race your car in the Baja desert race. You must follow the twisting course and miss trees, rocks, and other obstacles. Has ten different levels and keeps track of the score for up to 6 drivers..... **$15.95 / 19.95**

ALL GAMES AT DISCOUNT

10% OFF ON ONE GAME
15% OFF ON TWO GAMES
20% OFF ON THREE GAMES.
You must ask for discount at the time order is placed!

Dungeon Escape

A truly exciting game based on Dungeon and Dragons™ it has real time action, graphics, great sound and best of all it has a totally random drawn dungeon so the game is completely different every time you play. Rated in the top ten for the last three months *(This is Computer Shacks best selling game)*
NEW LOWER PRICE only $15.95 for tape and $19.95 for disk.

Dungeon Escape

CATERPILLAR

The Newest game by Larry Ashmun. A real blockbuster equal to his outstanding Alien Defense. Based on the game Centipeed. Sure to be a #1 game shortly..... **$15.95 / 19.95**

Simon and Merfunkle

A new game by Kyle Hoyt... An excellent game for kids from 6 to 60. Easy to learn fun to play. Based on the game Simon. Play music with flashing graphics and you must repeat the graphics or the music. Two different games..... **$15.95 / 19.95**

COMPUTER SHACK
1691 Eason • Pontiac, Michigan 48054
Information..... (313) 673-2224 Orders..... 1-800-392-6881

See List of Advertisers on page 338

Listing 1 continued

```
THEN 390 ELSE 430
440 A=RND(166):IF P(A)=0,SP(X)=A:P(A)=1 ELSE 440
450 NEXT:F=1:K=0:GOSUB 2320
460 '
                        SPY VERSE SPY
                            MENU
470 '
480 GOSUB 2280:PRINT
490 PRINT"1.  INITIAL MISSION ORDERS"
500 PRINT"2.  MISSION UPDATES"
510 PRINT"3.  MISSION ASSIGNMENT SUMMARY
520 PRINT"4   MISSION RECORD SUMMARY"
530 PRINT"5.  MAIN MENU"
540 PRINT"6.  OICE"
550 PRINT"7.  HIT/SCORE TABLE"
560 GOSUB 2260:IF B<6 THEN ON B GOTO 570,700,880,950,260 ELSE ON B-5 GOSUB 1880,
1960:GOTO 480
570 CLS:PRINT@460,"TOP SECRET MESSAGES FOR SPY VERSE SPY"
580 GOSUB 2250:IF B=1 THEN 2510
590 '
                  INITIAL MISSION MESSAGES
600 '
610 X=0:INPUT"ENTER AGENT'S CODE NUMBER";X:IF X>T PRINT"MISTAKE":PRINT:GOTO 610
ELSE IF X=0 THEN 480
620 CLS:PRINT@214,"SECRET MISSION":PRINT
630 PRINT"AGENT "PN$(X)
640 PRINT"CODE NUMBER"PN(X):PRINT"CODE NAME "AN$(X)
650 PRINT"YOU HAVE BEEN ASSIGNED COLOR  "AC$(X)
660 PRINT"YOUR STARTING POINT IS MARKER NUMBER"SP(X)
670 PRINT"YOUR INITIAL MISSION IS TO ELIMINATE  "N$(X):PRINT I$(RND(16)):PRINT:G
OSUB 2270:CLS:GOTO 610
680 '
                        MISSION UPDATE
690 '
700 X=0:CLS:INPUT"ENTER YOUR CODE NUMBER":X:PRINT:IF A(X)=0,PRINT"MISTAKEN INPUT
 "PN$(X)" HAS BEEN ELIMINATED":GOSUB 2270:GOTO 700
710 PRINT"AGENT ";AN$(X):PRINT"HAVE YOU COMPLETED YOUR MISSION AND ELIMINATED "M
$(X):PRINT"FROM THE GAME ?":PRINT" ( Y OR N )":GOSUB 2260
720 IF A$="N" CLS:PRINT@448,"WELL GET OUT THERE AND GET WITH IT AGENT ";AN$(X)".
 YOU ARE WASTING TIME":GOSUB 2260:GOTO 480
730 PRINT:PRINT"AN EXCELLENT REPORT AGENT ";AN$(X);".":PRINT"YOUR NEXT MISSION I
S AS FOLLOWS:"
740 A(AC(X))=0:K=K+1
750 IF K+1=T,CLS:PRINT@448,PN$(X);" , "AN$(X):PRINT:PRINT"YOU ARE THE WINNER !";
GOSUB 2260:GOTO 480
760 AC$(X)=C$(RND(7))
770 R=RND(T):IF R<>X AND A(R)<>0,M$(X)=PN$(R) ELSE 760
780 GOSUB2250:IF B=1 THEN 2600
790 PRINT TAB(12)"TOP SECRET MESSAGE"
800 PRINT"AGENT "PN$(X)
810 PRINT"CODE NUMBER"PN(X):PRINT"CODE NAME "AN$(X)
820 PRINT"YOU HAVE BEEN REASSIGNED COLOR  "AC$(X)
830 PRINT"YOUR NEXT MISSION IS TO ELIMINATE  "N$(X):PRINT I$(RND(16)):GOSUB 2270
:CLS
840 FOR Z=1 TO T:IF Z<>X AND AC(Z)=AC(X),AC(Z)=X:M$(Z)=PN$(X)
850 NEXT:R$(X)=R$(X)+PN$(AC(X))+" , "1AC(X)=PN(R):GOTO 480
860 '
                     ASSIGNMENT SUMMARY
870 '
880 GOSUB 2240:IF B=1 THEN 2950
890 CLS:PRINTTAB(21)"ASSIGNMENT SUMMARY":PRINT
900 PRINT"PLAYER      STARTING PT.      COLOR              ASSIGNMENT"
910 FOR X=1 TO T:IF A(X)<>0,PRINTPN$(X)TAB(15)SP(X)TAB(30)AC$(X)TAB(50)M$(X)
920 NEXT:GOSUB 2260:GOTO 480
930 '
                        MISSION RECORD
940 '
950 CLS:PRINTTAB(18)"GAME ASSIGNMENT RECORD"
960 GOSUB 2250:IF B=1 THEN 3000
970 CLS:Z=0:PRINTTAB(18)"GAME ASSIGNMENT RECORD":PRINT:PRINT"PLAYER"TAB(50)"RECO
RD":FOR X=1 TO T:PRINT PN$(X)TAB(22)R$(X):Z=Z+1:IF Z=10,Z=0
980 NEXT X:GOSUB 2260:GOTO 480
990 '
*****************************************************************
1000 '
                        RENDEZVOUS
                        GAME SETUP
1010 '
*****************************************************************
1020 Z=0:IF K=1 THEN 1210 ELSE CLS:PRINT@468,CHR$(23);
1030 FOR X=1 TO T:A(X)=0:NEXT X
1040 FOR X=1 TO T1
1050 C=RND(7):IF C(C)=1 THEN 1050 ELSE C(C)=1
1060 FOR K=1 TO 0 STEP -1
1070 A=RND(T):IF A(A)=0,A(A)=1 ELSE 1070
1080 TM$(X)=PN$(A)+S$(K)+TM$(X):TM=(X*2)-K:TM(A)=X:PRINT MID$(T1$,TM,1);
1090 AC$(A)=C$(C):AC(X)=C
1100 FOR Y=1 TO T:SP(Y)=RND(166):Z=0
1110 Z=Z+1:IF Z=Y THEN 1120 ELSE IF SP(Y)=SP(Z),Y=Y-1 ELSE IF Z=T THEN 1120 ELSE
 1110
1120 NEXT Y,K,X:PRINT@468,T1$
1130 K=1
1140 M1=T1*3
1150 FOR X=1 TO M1:M(X)=RND(166):C(X/3)=-1:P(X)=0:Z=0
1160 Z=Z+1:IF Z=X THEN 1170 ELSE IF M(X)=M(Z),X=X-1 ELSE 1160
1170 NEXT X
1180 GOSUB 2320
1190 '
                        RENDEZVOUS
                           MENU
1200 '
1210 CLS:PRINTCHR$(23)TAB(10)"RENDEZVOUS":PRINT:PRINT
1220 PRINTTAB(2)"1  MISSION MARKER ASSIGNMENTS"
1230 PRINTTAB(2)"2  PLAYER ASSIGNMENTS"
1240 PRINTTAB(2)"3  SPY TEAM ASSIGNMENTS"
```

Listing 1 continues

didn't like watching her frumpy husband digging in heaps of garbage. Other drawbacks include cats and insects—still it's better than drinking over 332 liters of soft drinks. I collected all I needed in just two weekends.

Arrange the markers a uniform distance apart. Distances of two to four feet work best. The play field's pattern is illustrated in Fig. 1. Other patterns will work, possibly even better. The play field should provide a number of different routes. A dead end with a single *turn* marker located at the terminus would certainly cause a stir. Evenly distribute the color groups around the field. The number of special purpose markers is up to you, but the game appears to be more enjoyable when the total number of *turn* and *safe zone* markers make up no more than about 10 percent of the total number of markers.

To lay out the field use a string with premeasured markings. Using the string two people can set up the field fairly quickly.

The Program

The program includes a printer option allowing players to have a printout of their missions. This is particularly important in Rendezvous where a large number of specific field markers must be collected by the spy teams. If a printer is not available players can record pertinent information by hand.

Although the Key Box indicates you need 32K RAM, there are ways around this limitation. The program was written with a luxurious number of REM statements to aid understanding and debugging. The Remark statements can be deleted without disturbing program continuity. None of the GOTO and GOSUB statements reference a REM statement. You can also easily delete the print option. All LPRINT subroutines have been lumped into one big block. The branching statements, within the main program loop, are contained in isolated lines which can be easily removed. Table 1 lists the program lines to delete if you have no printer. Now the program requires approximately 14K of memory. With the printer and REM statements removed the program requires only about 12K. With the printer option intact and only the REM statements removed the program requires approximately 13K of memory.

Program Listing 2 generates a printout of the field pattern used in Fig. 2. The program is capable of printing the play field by marker color or number. While it is a standalone program it can easily be appended to the game program with slight modifications. Because the first line number begins at 4000, just include the program and add branching statements to the game menus.

The field of play pattern generator is also useful as a map for use during the game. If you do not have a printer photocopy Fig. 1.

The game program is divided into six blocks. The first block consists of the general purpose operations: defining, di-

TELEWRITER

the Color Computer Word Processor

the only one with all these features for your TRS-80 Color:

51 column x 24 line screen display — Sophisticated full-screen editor
Real lower case characters — Powerful text formatter
Works with any printer — Special MX-80 driver
Runs in 16K or 32K — Disk & cassette I/O

requires absolutely no hardware modifications

TELEWRITER

Telewriter is the powerful word processor designed specifically for the Color Computer. It can handle almost any serious writing job and it is extremely easy to use. It has all the advanced features you need to create, edit, store, format and print any kind of text. With Telewriter you can quickly produce perfect, finished copy for letters, reports, term papers, articles, technical documentation, stories, novels, screenplays, newsletters. It is also a flexible and efficient way to take notes or organize ideas and plans.

51 x 24 DISPLAY

The Color Computer is an incredibly powerful and versatile computer, but for text editing it has some major drawbacks. The small 32 character by 16 line screen format shows you too little of the text and, combined with its lack of lower case letters, bears little resemblance to the way text really looks on the page. Reverse video in place of lower case just adds confusion.

Telewriter eliminates these shortcomings with **no hardware modifications required.** By using software alone, Telewriter creates a new character set that has **real lower case letters**, and puts 24 lines of 51 characters on the screen. That's more on-screen characters than Apple II, Atari or TRS-80 Model III. That's more than double the Color Computer's standard display.

FULL SCREEN EDITOR

The Telewriter editor is designed for maximum ease of use. The commands are single key (or single key plus control key), fast, and easy to remember. There is no need to switch between insert modes and delete modes and cursor movement modes. You simply type. What you type is inserted into the text at the cursor, on the screen. What you see on the screen is always the current state of your text. You can move quickly through the text with one key cursor movement in all 4 directions, or press the shift key simultaneously for fast, auto-repeat. You can jump to the top or bottom of the text, the beginning or end of a line, move forward or backward a page at a time, or scroll quickly up or down. When you type past the end of the line, the wordwrap feature moves you cleanly to the next.

. . . one of the best programs for the Color Computer I have seen . . .
— Color Computer News, Jan. 1982

You can copy, move or delete any size block of text, search repeatedly for any pattern of characters, then instantly delete it or replace it with another. Telewriter gives you a tab key, tells you how much space you have left in memory, and warns you when the buffer is full.

FORMAT FEATURES

When it comes time to print out the finished manuscript, Telewriter lets you specify: left, right, top, and bottom margins; line spacing and lines per page. These parameters can be set before printing or they can be dynamically modified during printing with simple format codes in the text.

. . . truly a state of the art word processor . . . outstanding in every respect.
— The RAINBOW, Jan. 1982

Telewriter will automatically number pages (if you want) and automatically center lines. It can chain print any number of text files from cassette or disk without user intervention. You can tell it to start a new page anywhere in the text, pause at the bottom of the page, and set the Baud rate to any value (so you can run your printer at top speed).

You can print all or any part of the text buffer, abort the printing at any point, and there is a "Typewriter" feature which allows you to type straight to your printer. Because Telewriter lets you output numeric control codes directly (either from the menu or during printing), it works with any printer. There's even a special driver for the Epson MX-80 that lets you simply select any of its 12 fonts and do underlining with a single underline character.

CASSETTE AND DISK I/O

Because Telewriter makes using cassette almost painless, you can still have a powerful word processor without the major additional cost of a disk. The advanced cassette handler will search in the forward direction till it finds the first valid file, so there's no need to keep retyping a load command when you are lost in your tape. The Verify command checks your cassette saves to make sure they're good. You can save all or any part of the text buffer to disk or cassette and you can append pre-existing files from either medium to what you have in the buffer already.

AVAILABLE NOW

Telewriter turns your Color Computer into the lowest cost hi-power word processor in the world today. It runs in 16K or 32K (32K recommended) and is so simple you can be writing with it almost immediately. It comes with 63 pages of documentation and is fully supported by Cognitec. Telewriter costs $49.95 including shipping (California residents add 6% tax). To order, specify disk or cassette and send check or money order to:

Cognitec
704 Nob Ave.
Del Mar, Ca. 92014

Or call (714) 755-1258 weekdays 7 AM-4PM PST. We will gladly answer your questions.

Apple II is a trademark of Apple Computer, Inc.; Atari is a trademark of Atari, Inc.; TRS-80 is a trademark of Tandy Corp.; MX-80 is a trademark of Epson America, Inc. ✓ 121

✓ See List of Advertisers on page 338

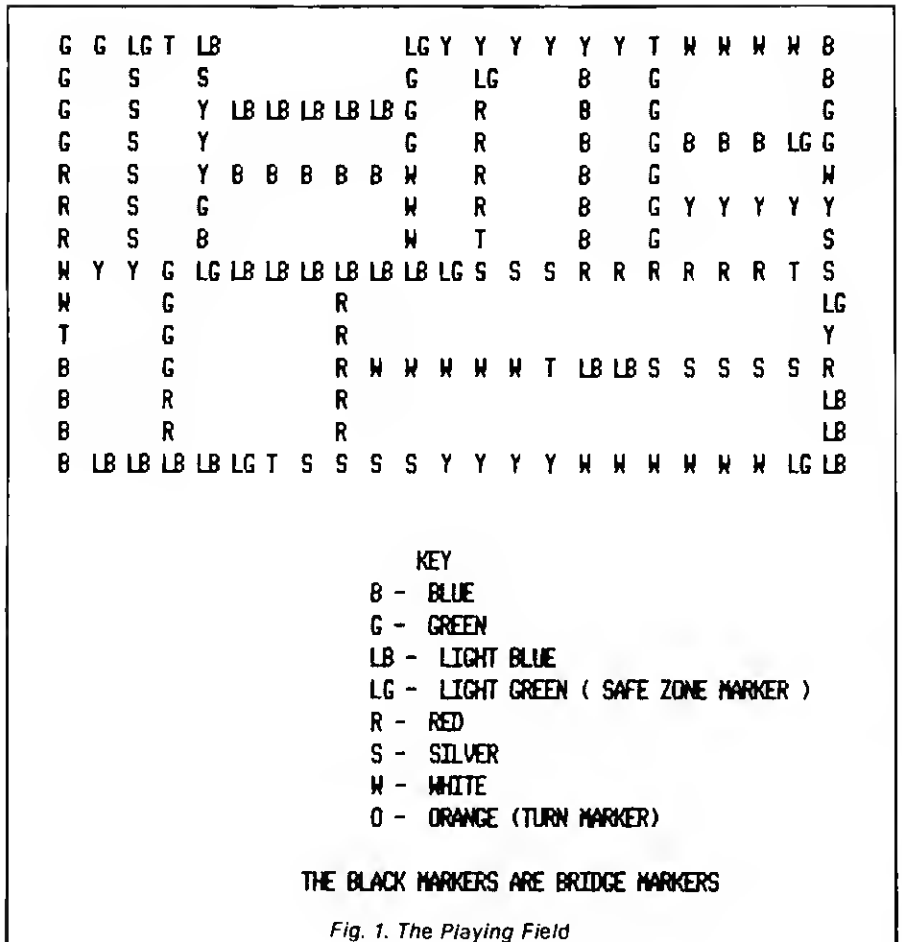


Fig. 1. The Playing Field

Listing 1 continued

```
1250 PRINTTAB(2)"4  TRAPS & BRIDGES"
1260 PRINTTAB(2)"5  SPRING TRAP"
1270 PRINTTAB(2)"6  MAIN MENU"
1280 PRINTTAB(2)"7  DICE"
1290 PRINTTAB(2)"8  HIT/SCORE TABLE"
1300 GOSUB 2260:IF B<7 THEN ON B GOTO 1330,1410,1540,1640,1640,260 ELSE ON B-6 G
OSUB 1880,1960:GOTO 1210
1310 '
                MISSION MARKER ASSIGNMENTS
1320 '
1330 CLS:PRINT@470,"MISSION MARKERS"
1340 GOSUB2250:IF B=1 THEN 2670
1350 CLS:PRINT TAB(18)T1$;" MISSION MARKER
"TAB(24)"ASSIGNMENTS"
1360 PRINT
1370 FOR X=1 TO M1:PRINT, X"."TAB(40)M(X):NEXT X
1380 GOSUB 2260:GOTO 1210
1390 '
                  RENDEZVOUS ASSIGNMENTS
1400 '
1410 CLS:PRINTTAB(20)"RENDEZVOUS ASSIGNMENTS":PRINT
1420 GOSUB 2250:IF B=1 THEN 2730
1430 X=0:INPUT"ENTER AGENT'S CODE NUMBER";X:IF X>T PRINT"MISTAKE":PRINT:GOTO 143
0 ELSE IF X=0 THEN 1210 ELSE CLS
1440 PRINT TAB(12)"TOP SECRET MESSAGE"
1450 PRINT"AGENT  "AN$(X)"  ( "PN$(X)" )"
1460 PRINT"YOU HAVE BEEN ASSIGNED THE CONTACT COLOR - "AC$(X)
1470 PRINT"YOU ARE ASSIGNDED TO SPY TEAM";TM(X)
1480 PRINT"YOUR STARTING POINT IS MARKER NUMBER "SP(X)
1490 PRINT"FOLLOWING IS A LIST OF THE MARKERS THAT MUST BE COLLECTED.TO WINYOU A
ND YOUR CONTACT MUST COLLECT THE MOST MARKERS . ";
1500 PRINT"REMEMBER - YOU MUST FIRST MAKE CONTACT, DESIGNATE YOUR NOME MARKER AN
D     ESTABLISH YOUR TRAP BEFORE YOU CAN BEGIN YOUR MISSION":PRINT"GOOD LUCK !"
1510 FOR Y=1 TO M1:PRINT M(Y),:NEXT Y:GOSUB 2260:CLS:GOTO 1430
1520 '
                    SPY TEAM ROSTER
1530 '
1540 CLS:PRINTTAB(20)"SPY TEAM ROSTER":PRINT
1550 GOSUB 2250:IF B=1 THEN 2870
1560 CLS:PRINTTAB(20)"SPY TEAM ROSTER":PRINT
1570 PRINT"TEAM NO."TAB(17)"MEMBERS"TAB(45)"COLOR GROUP"
1580 FOR X=1 TO T1
1590 PRINTX"."TAB(17)TM$(X)TAB(45)C$(AC(X))
1600 NEXT X
1610 GOSUB 2270:GOTO 1210
1620 '
                     TRAPS & BRIDGES
1630 '
```

Listing 1 continues

mensioning and initializing most of the variables. The number of players and their names are entered here. This section also includes the program's master menu. It provides access to the two games, player identification codes and gives the order of players' moves.

The primary menus of both games include a return to the master menu option.

The second and third blocks contain the two games, Spy Versus Spy and Rendezvous, respectively. The fourth block contains miscellaneous operations: dice rolls, hit probability routine and a sort utility used to determine the order of player turns. The fifth block is the printer option and the sixth contains all data statements. Each of the six blocks, as well as all of the subroutines, are introduced by an identifying REM statement, making it easy to follow the flow of the program.

The listing contains 30 integer variables which include nine arrays. In addition, there are 16 string variables, of which 11 are arrays. That is where all the memory went. Arrays are neat and easy to use, but they do eat up memory.

Computer Command Center

The computer's role is that of controller and records keeper. It assigns the missions with updates as changes occur and maintains a complete record. It also rolls the dice, keeps track of how many times someone rolled triples and tells everyone who goes first.

The game menu commands are self-explanatory. In Spy Versus Spy, the game menu consists of seven commands. The initial Mission command should only be used at the beginning of the game. The Mission Update command is used during play. In each of these cases the information is specific to a particular player and should not be seen by the other players. There is also a hit/probability option used to determine whether a legal squirt from a water pistol is a hit or a miss. The remaining two menu commands access the record keeping utilities; current player assignments; and a record of the game's progress so far. The assignment summary should be used by the mission master to keep tabs on the game. The game record is most useful after the game is over.

The game menu for Rendezvous consists of eight commands. These are the general purpose commands: dice rolls, return to the main menu and hit/probability. In addition, the command Player Assignments performs essentially the same function as the Initial Mission command in Spy Versus Spy. The command Spy Team Assignments should only be used by the mission master. The Mission Marker command calls the list of field markers which must be collected during the current game. The two remaining commands deal with traps and bridges and are explained in the rules.

Spy Versus Spy Rules

- Each spy is assigned the name of another spy by the computer. His mission is to

If you *liked* MICROPROOF, then you'll *love* SON OF MICROPROOF:

ELECTRIC WEBSTER T.M.

The ultimate spelling checker.

IMPROVED:

- One step proofing and correcting.
- Lists errors to screen or printer.
- Can display errors in context.
- Can display dictionary to locate correct spellings.
- 100% ACCURATE: won't ever miss an error.
- Remarkably compact (50,000 word dictionary will fit on one 5 inch disk).
- Even FASTER than MICROPROOF (formerly the fastest available).
- Simple Grammatical Checking (Optional Feature).
- Hyphenates automatically (Optional Feature available for some Word Processing programs).

SELECT APPROPRIATE RESPONSE:

CORRECT MISSPELLED WORD	ENTER CORRECT WORD
LEAVE WORD 'AS IS'	HIT <ENTER> KEY
DISPLAY WORD IN CONTEXT:	?
DISPLAY DICTIONARY:	@
ADD WORD TO DICTIONARY	+
EXIT	!

WORD: (Your error)
RESPONSE:

EASY TO USE: Prepare your text on any Z-80 based microcomputer using any of a number of popular word processing programs. When you are finished, enter the appropriate command, and ELECTRIC WEBSTER proofreads your document, displaying misspellings and typos on the screen. Then correcting ELECTRIC WEBSTER can display each error separately, requesting you to enter the correct spelling for each. You are also given the option of displaying errors in context or adding words to ELECTRIC WEBSTER's 50,000 word vocabulary. If you do not know the correct spelling you may also ask ELECTRIC WEBSTER to look it up for you and display the dictionary. Finally, ELECTRIC WEBSTER corrects your document. All in less than a minute.

LOW PRICES. Standard MICROPROOF is available for $69.50 (TRS-80). Standard ELECTRIC WEBSTER is available for either $89.50 (TRS-80® Model I or III, Apple®) or $149.50 (CP/M,® TRS-80 Model II and all others). The optional correcting feature can be added at any time for an additional $60. Correction feature can be ordered with patch to integrate with your word processing software. For each patch, optional Grammatical Checking feature, or optional Hyphenation feature, add $35. (Integration patch not necessary for Wordstar ™.)

SPEED is the single most important criterion in a dictionary program. All dictionary programs will find your potential errors but if the program is too slow, you are not likely to use it. ELECTRIC WEBSTER's speed is outstanding. It can proofread a several page letter in 20 seconds.

ELECTRIC WEBSTER's FULL 50,000 WORD VOCABULARY saves you time and allows you greater confidence in the lists of potential errors that ELECTRIC WEBSTER identifies. The mini-dictionary programs with their 10,000 and 20,000 word vocabularies, have many correctly spelled words omitted from their vocabularies. Consequently, they identify as potential "errors" many words that are actually spelled correctly. Five to ten times as many such words as does ELECTRIC WEBSTER. So when you use ELECTRIC WEBSTER you will have far fewer extra words to evaluate, a major time savings. There will be less need to look up words in order to verify that they are in fact spelled correctly. The extra 30,000 words in ELECTRIC WEBSTER's vocabulary assures you confidence in the error lists that Electric Webster generates.

HERE'S WHAT THE REVIEWERS HAVE TO SAY ABOUT MICROPROOF:

"I have already found that the use of MICROPROOF has greatly enhanced the quality of my letters and reports. This is a very useful product and should be obtained by anyone who uses a word processor."

Michael Tannenbaum, CPA
80 Microcomputing, August 1981

"The summary review of this program: One word — Excellent. I highly recommend it for anyone using a word processor for any need — articles, manuals, reports, and even letters of substantial length."

A. A. Wicks, Program Previews
Computronics, September 1981

In a comparative review of proofreading programs (with small-er dictionaries), MICROPROOF was found to be considerably faster than all the others when tested against a 400 word sample document.

Philip Lemmons
BYTE Magazine, November 1981

"(MICROPROOF) operates with good speed and efficiency. A 1500 word document took 26 seconds to load, process, and proof when the program was run on a TRS-80® Model II under CP/M.®

"Once the program is integrated, it is very friendly and any person able to use a word processing program can master it in moments."

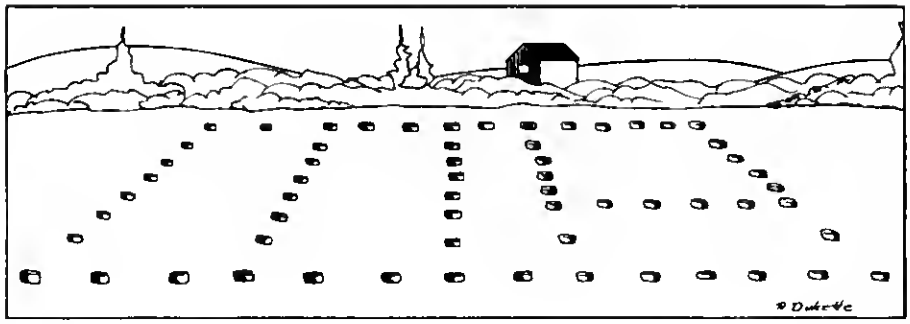
Frank Derfler
Info-World, January 1982

See your local microcomputer dealer or write to:

NOW AVAILABLE FOR APPLE!

CORNUCOPIA SOFTWARE

Post Office Box 5028, Walnut Creek, California 94596 ■ (415) 524-8098



Listing 1 continued

```
1640 CLS:IF B=4 PRINTTAB(20)"TRAPS & BRIDGES" ELSE PRINT@470,"TRAP !!!!!! ?"
1650 GOSUB 1760:IF B=5 GOSUB 1790:GOTO 1740
1660 IF C(Z)=-1 GOSUB 1790:GOSUB 1770:IF TP=0 THEN 1660 ELSE C(Z)=0:GOTO 1800
1670 IF C(Z)=0 INPUT"DO YOU WISH TO BUILD A TRAP (1) OR A BRIDGE (2)";C(Z)
1680 IF C(Z)=1 AND P(Z)>0 PRINT"TEAM"Z"ALREADY HAS A TRAP AT MARKER"P(Z):C(Z)=0:
GOTO 1800
1690 GOSUB 1930:A(Z)=A(Z)+D1+D2+D3
1700 IF A(Z)=>25+(C(Z)-1)*10 THEN ON C(Z) GOTO 1720,1730
1710 PRINT T$(C(Z))" CONSTRUCTION IN PROGRESS":PRINT"THE TEAM NOW HAS A CREDIT O
F"A(Z):GOTO 1800
1720 GOSUB 1790:GOSUB 1770:IF TP=0 THEN 1720 ELSE 1800
1730 PRINT"BRIDGE COMPLETED BY TEAM"Z:A(Z)=0:C(Z)=0:GOTO 1800
1740 IF P(Z)=TP THEN P(Z)=0:PRINT:PRINT TAB(24)"TRAP SPRUNG !!!":GOTO 1800
1750 PRINT:PRINT"SORRY ! TEAM"Z"'S TRAP IS MARKER"P(Z):GOTO 1800
1760 PRINT:INPUT"ENTER SPY TEAM NUMBER";Z:RETURN
1770 PRINT"TRAP MARKER"TP;:FOR Y=1 TO T:IF P(Y)=TP PRINT"NOT ";:TP=0
1780 NEXT Y:PRINT"CONFIRMED FOR TEAM"Z:P(Z)=TP:A(Z)=0:RETURN
1790 INPUT"ENTER THE NUMBER OF THE MARKER";TP:RETURN
1800 GOSUB 2270:GOTO 1210
1810 '
*****************************************************************
1820 '
                        MISCELLANEOUS
1830 '
*****************************************************************
1840 CLS:PRINT@448,"THE TOTAL NUMBER OF PLAYERS EXCEEDS THE PLAYING FIELD CAPABI
LITY":PRINTTAB(12)"THE TOTAL MUST BE REDUCED BY"T-14" SORRY"
1850 GOSUB 2270:GOTO 1210
1860 '
                              DICE
1870 '
1880 CLS:D4=0:PRINTCHR$(23)TAB(12)"DICE":PRINT
1890 GOSUB 1930
1900 PRINTTAB(6)"THE DIE VALUES ARE":PRINTTAB(8)D1"   "D2"   "D3:PRINT:PRINTTAB(
8)"A TOTAL OF "D1+D2+D3:IF D1=D2 AND D2=D3,D4=1:PRINT"YOU HAVE ROLLED TRIPLES RO
LL    AGAIN AFTER PLAYER HAS MOVED":PRINT
1910 GOSUB 2260
1920 IF D4=1 THEN 1880 ELSE RETURN
1930 FOR X=1 TO RND(T*T):D1=RND(7)-1:D2=RND(7)-1:D3=RND(7)-1:NEXT:RETURN
1940 '
                    SCORE PROBABILITY TABLE
1950 '
1960 CLS:PRINT@460,CHR$(23)"SCORE PROBABILITY TABLE":PRINT
1970 PRINTTAB(2)"(1)  SCORE PROBABILITY"
1980 PRINTTAB(2)"(2)  SCORE PROBABILITY TABLE"
1990 GOSUB 2260
2000 CLS:PRINTTAB(20)"SCORE PROBABILITY TABLE":PRINT
2010 PRINTTAB(10)"RANGE"TAB(35)"PROBABILITY OF SCORING A HIT"
2020 PRINTTAB(12)"1"TAB(45)"100 %  ( 1 - 10)"
2030 PRINT"GREATER THAN 1 BUT LESS THAN 6"TAB(46)"70 %  ( 1 - 7 )"
2040 PRINT"GREATER THAN 5 BUT LESS THAN 8"TAB(46)"50 %  ( 1 - 5 )"
2050 PRINT"GREATER THAN 7 BUT LESS THAN 11"TAB(46)"30 %  ( 1 - 3 )"
2060 PRINT"GREATER THAN 10 BUT LESS THAN 16"TAB(46)"20 %  ( 1 - 2 )"
2070 PRINT"GREATER THAN 15"TAB(46)"10 %  ( 1 - 1 )"
2080 IF B=2 GOSUB 2270:RETURN
2090 '
                        PROBABILITY
2100 '
2110 PRINT
2120 INPUT"ENTER THE SHORTEST COUNTABLE RANGE";R
2130 X=RND(10)
2140 PRINT@904,"THE COMPUTER HAS DETERMINED A RANDOM FACTOR OF":PRINTTAB(24)X" F
OR YOU";
2150 IF R=1 THEN 2220
2160 IF R<=5 AND X<=7 THEN 2220
2170 IF R>5 AND R<=7 AND X<=5 THEN 2220
2180 IF R>7 AND R<=10 AND X<=3 THEN 2220
2190 IF R>10 AND R=<15 AND X<=2 THEN 2220
2200 IF R>15 AND X=1 THEN 2220
2210 FOR Y=1 TO 10:PRINT@790,"SORRY, IT'S A MISS !";:FOR X=1 TO 50:NEXTX:GOTO 223
0
2220 FOR Y=1 TO 10:PRINT@790," IT'S A HIT !";:FOR X=1 TO 50:NEXT X
2230 PRINT@790,CHR$(30);:FOR X=1 TO 50:NEXT X,Y:RETURN
2240 PRINT:PRINT "HARD COPY (1) OR CRT READOUT (2)":GOTO 2260
2250 PRINT:PRINT TAB(14)"HARD COPY (1) OR CRT READOUT (2)"
2260 A$=INKEY$:IF A$="" THEN 2260 ELSE B=VAL(A$):RETURN
2270 PRINTTAB(18)"PRESS ENTER TO CONTINUE";:GOTO 2260
2280 CLS:PRINT@398,CHR$(23)"SPY VERSES SPY"
2290 RETURN
2300 '
                        PLAYER TURN SEQUENCE SORT
2310 '
2320 FOR X=1 TO T
2330 TP(X)=SP(X):TP$(X)=PN$(X)
```

Listing 1 continues

eliminate his opponent by scoring a hit with a water pistol. The computer randomly assigns each player an initial starting point and a home color. Duplication may occur only in the case of color.

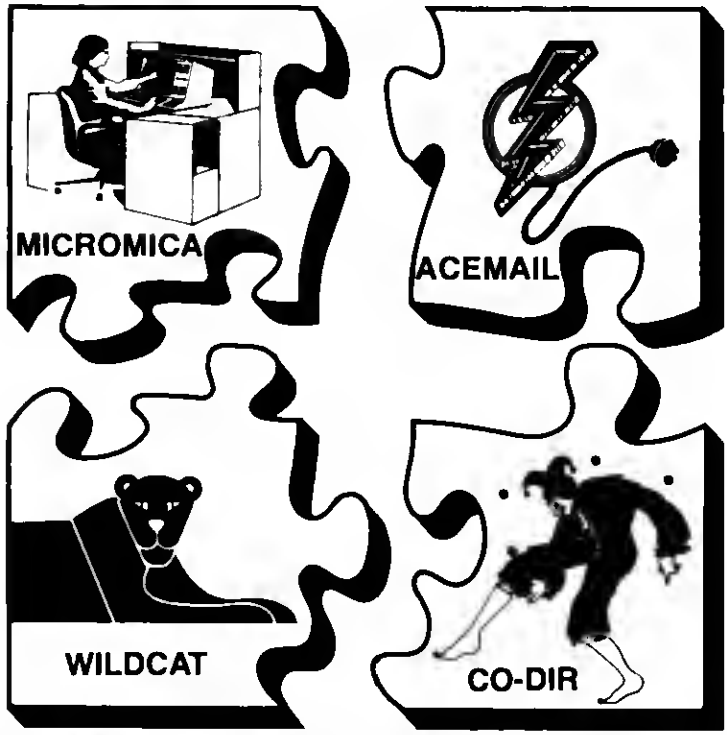
- Play begins with each player taking position by the marker with the number assigned.
- The player with the lowest number assignment goes first, the second lowest number next and so on. The computer will declare the order of player turns.
- The dice are rolled and the player moves the *total* number of markers indicated. A player may not reverse direction unless he makes a legal turn (and doubles back) or encounters an orange turn marker. If a player's roll carries him past a turn marker it is the player's option to turn or not to turn. However, if a player completes his turn on a turn marker he must turn on his next move. In games involving a large number of players you can avoid long delays by allowing all players to move at once to the same roll of the dice.
- The light green markers are safe zone markers. A player cannot be attacked while on a safe zone marker.
- Players eliminate other players by scoring a hit using the water pistol (a good squirt anywhere below the head will do). A legal hit eliminates a player from the game. Legal hits are those hits which are made when the target spy is on the attacking spy's color. The attacking spy does *not* have to be on his own color.
- Legal hits made from an adjacent marker always result in the elimination of the target spy. Hits made from a range other than adjacent must be referred to the score probability table. The range used to enter the probability table is equal to the shortest countable distance (continuous markers) between two spies. There may be cases where the straight line distance between the players may be much shorter than the countable distance. The maximum range is dictated by the water pistol, wind and, of course, player's aim. Regardless of position the attacker must first hit the target spy with a wet blast from his water pistol before the attack is considered a hit.
- When a player successfully eliminates another spy from the game he is issued a new assignment and a new color. Because of this feature it is possible for one player to have more than one pursuer. When a player's assigned spy is eliminated by another player the attacker spy now becomes the second pursuer's assignment. If there are more than two players remaining in the game the attacker spy is assigned a new target spy by the computer (all reassignments are made by the computer). When there are only two players remaining in the game they are each other's target.
- The computer simulates rolling three six-sided dice (zero to five digits). The values of the dice are summed. The totals can range from zero to 15. A player must move the total amount indicated by the dice. If the values of all three dice are

A PERFECT FIT!

MICROMICA DESK
$199.00
YOUR PRICE
$159.00

MICROMICA SHELF TOP ORGANIZER
$99.00
YOUR PRICE
$79.00

WILDCAT SOFTWARE
$59.00
YOUR PRICE
$39.00



ACE MAIL SOFTWARE
$79.00
YOUR PRICE
$49.00

HAYES STACK SMARTMODEM
$279.00
YOUR PRICE
$239.00

CO-DIR SOFTWARE
$69.00
YOUR PRICE
$39.00

FINDING SOLUTIONS TO PUZZLING PROBLEMS

TRS-80 ENHANCEMENT

ACE COMPUTER PRODUCTS presents a new generation of specialized software systems and furniture designed to professionally enhance your TRS-80 for maximum efficiency and enjoyment!

ELECTRONIC MAIL

Now you can access other computers, time sharing systems, and information utilities nationwide over the telephone. The unique ACE MAIL software package allows you to receive and transmit ASCII files from your COMPLETELY UNATTENDED TRS-80! This sophisticated, high performance, data communications system works in conjunction with the popular Hayes Stack Smartmodem featuring auto answer/auto dial, RS232C compatability, 7 LED indicators, an audio monitor, over 30 commands, end is programmeble in any language.

WILDCAT

Wildcat is a remarkable disk directory catalogue system which allows files to be easily identified even with obscure or conflicting file specs. Catalogue contains FILESPEC, First Line Remark, Disk I.D., Disk Name, Disk Date, and free grans. Object code files are marked and files without remarks are noted. Includes first line of all BASIC, SCRIPSIT, PENCIL, EDTASM, DATA, and ASCII type files.

DIRECTORY FILE PROCESSOR

CO-DIR is a rapid directory file processor which allows you to juggle programs listed on a disk directory using a pair of blinking cursors and a single keystroke. Never type a program name again! Access any directory page or program instantly! Accepts over 12 commands including Copy, Directory, Free, Help, "Do" file, Kill, List, Modify, Load Object, Print, Rename, Search, and Execute. Also features scrolling and word processing capabilities.

MICROMICA MODULAR WORK CENTER

Our custom furniture features modular engineering for system arrangements and expansion. Each desk, shelf organizer, or printer stand comes in a choice of colors with designer styling and presents a unique snap-lock system for easy assembly or breakdown without any tools.

CALL TOLL FREE!

Make ACE your one call shopping center for all software, hardware, furniture, or eccessories. Call our TOLL FREE order line for prices or litereture today!

ORDER TOLL-FREE **1-800-327-2283**

ACE COMPUTER PRODUCTS OF FLORIDA, INC.

1640 N.W. 3rd St., Deerfield Beach, Florida 33441 VOICE (305) 427-1257/DATA (305) 427-6300

SPECIFICATIONS

WILDCAT software for Model I using TRSDOS 2.3 or any version NEWDOS and Model III using NEWDOS 2.0 Requires 48K and two 5" drives. Specify Model and DOS when ordering.

CO-DIR software for Model I & III using DOSPLUS 3.3 & 3.4 or NEWDOS 80 1.0 & 2.0 Requires 32K and one 5" drive. Specify Model and DOS when ordering.

ACE MAIL software for Model I & III using DOSPLUS 3.3. & 3.4 or NEWDOS 80 1.0 & 2.0 Requires 48K and one 5" drive. Specify Model and DOS when ordering.

MICROMICA desk measures apprx. 48"W x 24"D x 27"H. Desk top shelf organizer measures 48"W x 12"D x 21"H. Mica colors available in Almond, Light Oak, Walnut, or White. Specify color when ordering.

Write or call ACE TOLL FREE at 1-800-327-2283. Florida residents call 305-427-1257. Please use the toll free line for orders, prices, or literature only. Technical assistance or service use the Florida line. MASTERCARD/VISA accepted Add freight on all orders. Florida residents add 5% sales tax. Prices subject to change without notice. ✓197

TRS 80 and TRSDOS trademark TANDY CORP NEWDOS trademark Apparat, Inc Hayes Stack Smartmodem trademark Hayes Microcomputer Products, Inc DOSPLUS trademark MICRO-SYSTEMS SOFTWARE, INC

✓ See List of Advertisers on page 338

Listing 1 continued

```
2340 NEXT X
2350 FOR I=1 TO T-1
2360 FOR J=I+1 TO T
2370 IF TP(I)<=TP(J) THEN 2390 ELSE PS=TP(I):TP(I)=TP(J)
2380 TP(J)=PS:PS=TP$(I):TP$(I)=TP$(J):TP$(J)=PS
2390 NEXT J,I:RETURN
2400 CLS:PRINT@470,"PLAYER TURN SEQUENCE":PRINT
2410 GOSUB 2250:IF B=1 THEN 3040
2420 CLS:PRINTTAB(20)"PLAYER TURN SEQUENCE":PRINT
2430 PRINT"TURN #","PLAYER",,"MARKER #"
2440 FOR X=1 TO T
2450 PRINTX".",TP$(X),,TP(X)
2460 NEXT X
2470 GOSUB 2260:GOTO 260
2480 '
                ******************************
                *       PRINTER BLOCK        *
                ******************************
2490 '
                        SPY VERSE SPY ROSTER
2500 '
2510 CLS:PRINT@466,"TOP SECRET MESSAGES FOR SPY VERSE SPY":FOR X=1 TO T:LPRINT L
1$TAB(12)"TOP SECRET MESSACE"L2$
2520 LPRINT"AGENT "PN$(X)
2530 LPRINT"CODE NUMBER"PN(X):LPRINT"CODE NAME "AN$(X)
2540 LPRINT"YOU HAVE BEEN ASSIGNED COLOR  "AC$(X)
2550 LPRINT"YOUR STARTING POINT IS MARKER NUMBER"SP(X)
2560 LPRINT"YOUR INITIAL MISSION IS TO ELIMINATE  "M$(X):LPRINT I$(RND(16))STRIN
C$(5,138)
2570 NEXT:I=1:GOTO 480
2580 '
                    SPY VERSE SPY UPDATE
2590 '
2600 LPRINT L1$TAB(12)"TOP SECRET MESSAGE"L2$
2610 LPRINT"AGENT "PN$(X)
2620 LPRINT"CODE NUMBER"PN(X):LPRINT"CODE NAME "AN$(X)
2630 LPRINT"YOU HAVE BEEN REASSIGNED COLOR  "AC$(X)
2640 LPRINT"YOUR NEXT MISSION IS TO ELIMINATE  "M$(X):LPRINT I$(RND(16))STRING$(
5,138):GOTO 840
2650 '
          RENDEZVOUS MISSION MARKER ASSIGNMENTS
2660 '
2670 LPRINT L1$TAB(8)"RENDEZVOUS MISSION MARKER
"L1$TAB(14)"ASSIGNMENTS"
2680 LPRINT STRING$(3,138)
2690 FOR X=1 TO M1:LPRINT TAB(38)M(X):NEXT X
2700 GOTO 1210
```

Listing 1 continues

equal (a triple) the player receives another roll that turn.

- Players may only wage attacks against other players after they have moved the full distance required by the dice roll. If a player rolls die values of two, four, and four, he must move a total of 10 markers. He may only wege an attack after he has reeched the tenth marker. If he is not going to attempt an attack he indicates *pess* and the turn passes to the next player. He may only wage an attack if the target spy is on the attacker's assigned color. In the case of a triple the full total of all dice rolls must be expended before an attack can be made.
- Players cannot move past other players. If a player finds his route completely blocked he must pass his turn to the next player. Players may not occupy the same marker at any time.

Rendezvous Rules

- As in Spy Versus Spy, each player is assigned a color and a starting position marker number. The order of player turns is also the same. The turn order changes somewhat as the game progresses and spy teams form. Teams that have formed roll the dice at the same time and combine their rolls for a single total. Since there are seven colors there can be a total of seven spy teams. Each team member is assigned the same base color.
- Each player's first objective is to find his teammates and form a spy team. A Spy

MARATHON SOFTWARE

PIK'EM 1982

64% ACCURATE AGAINST POINTSPREAD FOR 1981 SEASON (Games 2-16)

A COMPLETE FOOTBALL PREDICTION PROGRAM FOR THE 1982 NFL PROFESSIONAL REGULAR SEASON STARTING SEPT. 12, 1982*

★ ★ ★ ★ ★ ★

ONLY 20 MIN. DATA INPUT PER WEEK WILL GIVE YOU THE EDGE ON EVERYONE**

CAN BE UPDATED FOR 1983

VISA ORDER BY PHONE OR MAIL MasterCard

NAME _____
ADDRESS _____
CITY _____ ST _____ ZIP _____
PIKEM 24.95 PAYMENT ENCLO ☐
VISA ☐ MASTERCHARGE ☐ AC#
MY CARD EXPIRES ☐☐ ☐☐

$24.95 INCLUDES:
DATA DISKETTE
COMPLETE INSTRUCTIONS
SPECIFY:
TRS80 MODEL I/III
AT LEAST 32K

** DATA NEEDED TO RUN PROGRAM AVAILABLE IN LOCAL NEWSPAPERS OR CAN BE FURNISHED BY MARATHON SOFTWARE

DEALER INQUIRIES INVITED

—FEATURES—
- DISPLAYS PREDICTED SCORES 210 GAMES
- DISPLAYS ACCUMULATED STATS EACH TEAM
- DISPLAYS AVERAGE STATS EACH TEAM
- GIVES PRINTOUT PREDICTIONS—STATS—AVE
- AUTOMATICALLY STORES DATA — NO 'SAVE'

* IF PROGRAM IS BOUGHT AFTER SEASON STARTS — ALL PREVIOUS STATISTICS WILL BE INCLUDED NO EXTRA CHARGE.

FOR MORE INFORMATION CONTACT
MARATHON SOFTWARE DEPT. M
P O BOX 1493
JACKSONVILLE TEXAS 75766
(214) 586-8212

411

Team is formed when the two players who have been assigned the same color occupy a marker of that color at the same time. The marker at which the team members successfully contact each other is now their spy team's base of operations. A black marker should be placed beneath the field marker to designate it as the base of operations, making it easily distinguishable from other markers. The basic strategy for locating team members is simple—each player should attempt to stay on or near markers of his assigned color. By doing so players can quickly get an idea of who has what color.

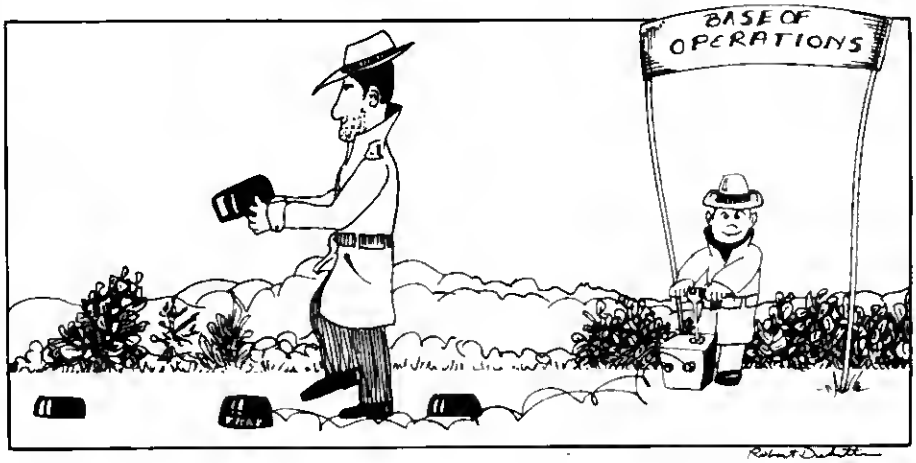
● As soon as a spy team has been formed the players no longer operate as individuals, but as a team. The newly formed team may not move on the next turn of the team member who was stationary at the time the contact was made. Instead of moving the team may designate the location of the team's *trap* to the mission master (see rule 4). From that point on, the turn of the team member on whose turn contact was originally made becomes the turn of the spy team. Both players receive dice rolls, which are summed. The players may split the total between them in any manner. One member may move the distance equal to the total while the second member moves none, or they could divide the total equally. The full distance indicated by the sum of dice rolls of both players must always be taken, except as noted in the fifth rule.

"Each player should attempt to stay on or near markers of his assigned color."

● Each team may secretly designate to the mission master one marker of their assigned color group as a trap. Any opposing team member who passes over a properly designated trap can loose any markers he has with him at the time. It is the option of the team operating the trap whether to spring their trap. They can let a player pass and say nothing. But if they want to snare his markers they can by declaring "trap!" The trap must then be verified. The team must announce the number of the marker for confirmation by the mission master. If the trap is confirmed by using the Spring Trap command the trapped player must turn over all his markers to the trapping team. If the trap is not confirmed the players continue without change.

● After having sprung a trap a team can lay a new trap or reestablish an old one by not moving any of the distance indicated by the sum of the dice rolls. Instead, the team

```
2710 '
                RENDEZVOUS ASSIGNMENTS
2720 '
2730 FOR X=1 TO T
2740 LPRINT L1$TAB(12)"TOP SECRET MESSAGE"L2$
2750 LPRINT"AGENT  "AN$(X)"  ( "PN$(X)" )"
2760 LPRINT" "
2770 LPRINT"  YOU HAVE BEEN ASSIGNED THE CONTACT COLOR - "AC$(X)
2780 LPRINT"YOU ARE ASSIGNED TO SPY TEAM";TM(X)
2790 LPRINT"YOUR STARTING POINT IS MARKER NUMBER "SP(X)
2800 LPRINT"THE FOLLOWING IS A LIST OF THE MISSION MARKERS THAT ARE TO BE COLLEC
TED"!LPRINT"IN ORDER TO WIN YOU AND YOUR CONTACT MUST COLLECT THE MOST MARKERS .
"
2810 LPRINT"REMEMBER - YOU MUST FIRST MAKE CONTACT, DESIGNATE YOUR HOME MARKER A
ND ESTABLISHYOUR TRAP BEFORE YOU CAN BEGIN YOUR MISSION."L2$
2820 LPRINTTAB(30)"- GOOD LUCK -"L2$L2$
2830 FOR Y=1 TO M1 STEP 3:LPRINT,M(Y),M(Y+1),M(Y+2):NEXT Y:LPRINTSTRING$(4,138)
2840 NEXT X:GOTO 1210
2850 '
                RENDEZVOUS TEAM ASSIGNMENTS
2860 '
2870 LPRINT L1$TAB(16)"SPY TEAM ROSTER"L2$
2880 LPRINT TAB(18)"TEAM NO."TAB(35)"MEMBERS"TAB(55)"COLOR GROUP"
2890 FOR X=1 TO T1
2900 LPRINT TAB(20)X",",TM$(X);TAB(57)C$(AC(X))
2910 NEXT X
2920 GOTO 1210
2930 '
                    ASSIGNMENT SUMMARY
2940 '  .
2950 LPRINTTAB(32)"CURRENT ASSIGNMENTS"STRING$(2,138):LPRINTTAB(6)"PLAYER      S
TARTING PT,        COLOR              ASSIGNMENT"
2960 FOR X=1 TO T:IF A(X)<>0,LPRINTTAB(6)PN$(X)TAB(21)SP(X)TAB(36)AC$(X)TAB(56)M
$(X)
2970 NEXT:GOTO 480
2980 '
                    ASSIGNMENT RECORD
2990 '
3000 LPRINTTAB(32)"GAME ASSIGNMENT RECORD":LPRINT" ":LPRINT"PLAYER
                    RECORD":FOR X=1 TO T:LPRINT PN$(X)TAB(22)R$(X):NEXT
3010 GOTO 480
3020 '
                PLAYER TURN SEQUENCE
3030 '
3040 PRINTTAB(26)"HARDCOPY"
3050 LPRINTTAB(26)"PLAYER TURN SEQUENCE"L2$L2$
3060 LPRINT"TURN #","PLAYER",,"MARKER #"
3070 FOR X=1 TO T
3080 LPRINTX".",TP$(X),,TP(X)
3090 NEXT X
3100 GOTO 260
3110 '
              ******************************
              *       DATA    BLOCK        *
              ******************************
3120 '
3130 DATA KING RAT,NUMBER,MR BIG,SLY,SNEAK NUMBER,CONTACT,CODE,SECRET AGENT,DOUB
LE AGENT,SUPER SNEAK,SNEAKY,00
3140 DATA DARK BLUE,LIGHT BLUE,YELLOW,RED,SILVER,DARK GREEN,WHITE,LIGHT GREEN,OR
ANGE
3150 DATA ONE OF THOSE DESPICABLE CHARACTERS WHO ACTUALLY CLEAN THEIR FINGER NAI
LS,A SUPER VILLIAN FOR THE OTHER SIDE ( OTHER SIDE OF WHAT WE DON'T KNOW )
3160 DATA  A KGB AGENT ( KRAZY GOOF BALL ),TERRORIST ( ESPECIALLY AT THE CARD GA
ME OLD MAID ),A REAL BAD EGG - DOESN'T KNOW THAT RELIEF IS SPELLED  R O L A I D
S,ONE WHO IS KNOWN TO ACTUALLY ENJOY DRINKING CASTOR OIL
3170 DATA A VERY DEADLY CHARACTER ( DEADLY BORING THAT IS ),ONE WHO IS SUSPECTED
 OF HAVING RING AROUND THE COLLAR,A KNOWN CONTACT FOR THE OTHER SIDE - WANTED TO
 BE A CHRISTAN BUT THEY WOULDN'T HAVE ANY PART OF IT
3180 DATA SUSPECTED HERETIC - THOUGHT TO PERFER THE PUBLIC BROADCASTING NETWORK
TO THE BIG THREE
3190 DATA DOESN'T LIKE HOT DOGS  APPLE PIE OR CHEVEROLET,THINKS APPLE PIE IS OUR
 NATIONAL PIE ( ANY FOOL KNOWS THAT IT IS PIZZA ),ONE WHO IS ALWAYS COMPLAINING
ABOUT SOME SILLY TUB OF MARGERINE WHICH INSISTS IT'S BUTTER
3200 DATA ONE OF THOSE DEGENERATES WHO READS THE INSTRUCTIONS BEFORE ASSEMBLING
ANYTHING,IS ONE OF THOSE DEGENERATES WHO CAN REFOLD A ROAD MAP PROPERLY THE FIRS
T TRY
3210 DATA ONE OF THOSE SUBVERSIVES WHO LIKE MAYONNAISE ON THEIR HAMBURGERS,ONE O
F THOSE SUBVERSIVES WHO ALWAYS PEELS AWAY THE CRUST FROM SANDWICH BREAD
```



```
AGENT RENE'
CODE NUMBER 1
CODE NAME 00 1
YOU HAVE BEEN ASSIGNED COLOR  DARK GREEN
YOUR STARTING POINT IS MARKER NUMBER 162
YOUR INITIAL MISSION IS TO ELIMINATE  ANN L.
DOSEN'T LIKE HOT DOGS  APPLE PIE OR CHEVEROLET
```

Fig. 2. Sample Assignment

```
4000 REM                    FIELD OF PLAY
4010 REM
4020 REM                SUPPLIMENTAL PROGRAM TO
4030 REM                    SPY VERSE SPY
4040 REM
4050 CLS:CLEAR 50
4060 DIM MN$(14),MC$(14),CI$(8),CN$(8)
4070 FOR X=1 TO 14:READ MN$(X):NEXT
4080 FOR X=1 TO 14:READ MC$(X):NEXT
4090 FOR X=1 TO 8:READ CN$(X):NEXT
4100 FOR X=1 TO 8:READ CI$(X):NEXT
4110 L1$=CHR$(27)+CHR$(14):L2$=STRING$(1,138)
4120 L3$=CHR$(27)+CHR$(20)
4130 CLS:PRINT@463,CHR$(23)"SPY VERSE SPY":PRINT:PRINTTAB(8)"FIELD OF PLAY"
4140 PRINT:PRINT"ENTER (1) FOR NUMERICAL MAP":PRINT"ENTER (2) FOR LETTER MAP"
4150 GOSUB 4350:IF B=0 OR B>2 THEN 4150
4160 LPRINT L3$ L1$TAB(28)"SPY VERSES SPY"
4170 LPRINT L3$ L1$ TAB(28)"FIELD OF PLAY"
4180 IF B=2 THEN 4280
4190 '
                      NUMBER LAY OUT
                     OF FIELD OF PLAY
4200 '
4210 LPRINT L3$ L1$TAB(28)"NUMBER LAY OUT"L2$ L2$ L2$
4220 FOR X=1 TO 14
4230 LPRINT L3$ TAB(20) MN$(X)
4240 NEXT X
4250 GOTO 4130
4260 '
                      LETTER LAY OUT
                     OF FIELD OF PLAY
4270 '
4280 LPRINT L3$ L1$TAB(28)"LETTER LAY OUT"L2$ L2$ L2$
4290 FOR X=1 TO 14
4300 LPRINT L3$ TAB(30) MC$(X)
4310 NEXT X
4320 LPRINT STRING$(2,138) TAB(60)" KEY":FOR X=1 TO 8:LPRINT TAB(55)CI$(X)" -  "
CN$(X):NEXT
4330 LPRINT L2$ TAB(50) "THE BLACK MARKERS ARE BRIDGE MARKERS"
4340 GOTO 4130
4350 A$=INKEY$:IF A$="" THEN 4350 ELSE B=VAL(A$):RETURN
4360 '
4370 '
4380 DATA 85  86  88  101 100                     118 119 120 127 128 129 145 14
4 146 147 148 149 150
4390 DATA 84      87      99                      117     121         130     16
6             151
4400 DATA 83      89      98  102 103 104 105 106 107     122         131     14
3             152
4410 DATA 82      90      97                      108     123         132     14
2 161 162 163 164 153
4420 DATA 81      91      96  114 113 112 111 110 109     124         133     14
1             154
4430 DATA 80      92      95                      115     125         134     14
0 160 159 158 157 155
4440 DATA 79      93      94                      116     126         135     13
9             156
4450 DATA 7   8   9   10  11  12  13  14  15  16  17  18  19  20  21  22  23  24
  25  26  27  28  29
4460 DATA 6           78                  48
              30
4470 DATA 5           77                  47
              31
4480 DATA 4           76                  46  45  44  43  42  41  40  39  38  37
  36  35  34  33  32
4490 DATA 3           75                  66
              49
4500 DATA 2           74                  65
              50
4510 DATA 1   73  72  71  70  69  68  67  64  63  62  61  60  59  58  57  56  55
  54  53  52  165 51
4520 DATA G  G  LG T  LB                LG Y  Y  Y  Y  Y  Y  T  W  W  W  W  B
4530 DATA G     S     S                 G     LG        B     G                 B
4540 DATA G     S     Y  LB LB LB LB LB G     R         B     G                 G
4550 DATA G     S     Y                 G     R         B     G  B  B  B  LG G
4560 DATA R     S     Y  B  B  B  B  B  W     R         B     G                 W
4570 DATA R     S     G                 W     R         B     G  Y  Y  Y  Y  Y
4580 DATA R     S     B                 W     T         B     G                 S
4590 DATA W  Y  Y  G  LG LB LB LB LB LB LB LG S  S  S  R  R  R  R  R  R  T  S
4600 DATA W       G              R                                          LG
4610 DATA T       G              R                                          Y
4620 DATA B       G              R  W  W  W  W  W  T  LB LB S  S  S  S  S  R
4630 DATA B       R              R                                          LB
4640 DATA B       R              R                                          LB
4650 DATA B  LB LB LB LB LB LG T  S  S  S  S  Y  Y  Y  Y  W  W  W  W  W  W  LG LB
4660 DATA BLUE,GREEN,LIGHT BLUE,LIGHT GREEN ( SAFE ZONE MARKER ),RED,SILVER,WHIT
E,ORANGE (TURN MARKER)
4670 DATA B,G,LB,LG,R,S,W,O
```

Program Listing 2. Field of Play

can build a credit of 25 units with the mission master. Upon securing a credit of 25 units the trap is secretly indicated to the mission master in the same manner. Any amount in excess of 25 is lost by the team. Movement may resume the *next* turn. Only one trap can exist per team at any one time. Building credits toward establishing a new trap does not have to be done on consecutive turns. A team may elect to build credit on one turn, move the next several turns and finish acquiring credits later. Credits *may not* be built while the team still has an operable trap.

● The base of operations marker is the point where acquired mission markers are stored. Unless a team member occupies the

"Enforced expropriation is a polite way of saying ambush."

marker, an opposing team can take the base marker by landing on it. If a team's marker is taken the team has one chance to get it back—if either or both members are on the team's color somewhere in the maze and if the team can score a hit with their water pistol. If both members are on the color, both may shoot but only one hit is counted. The shorter range is used to enter the score probability table. If the attempt to defend is successful, the intruding team returns the base marker and continues with their turn. The attempt to defend must be made while the intruder is on the defender's color and during the current turn. If the attempt fails the defending team is eliminated from the game and all their markers are turned over to the team that pulled off the caper.

● The mission markers are designated by the computer at the start of the game. Teams acquire the markers by terminating their turn on them. Once the marker has been removed it cannot be replaced that game. The removal of a marker blocks that route of the play field. Players may not pass over an open position. A team can erect a bridge (indicated by a black marker) over an opening by building 35 credits with the mission master. Unlike the procedures involving traps, once bridge building has begun it must continue in consecutive turns until there are enough credits to complete its construction. The team cannot move while building the bridge. Only one team member need land on a mission marker to claim it.

● Enforced expropriation is a polite way of saying ambush. It is a way one team can collect mission markers from another team. The ambush is accomplished by both members of the ambushing team. The player being ambushed has to be on the ambushing team's color. Both ambushers must be able to hit the target. The attack is then treated by the score probability table like all other

DAISY WHEEL
By SMITH-CORONA

SAVE $500.00

...and more over all other popular Daisy Wheel Printers.

- 120 WORDS PER MINUTE • FRICTION FEED
- CHANGEABLE DAISY WHEEL TYPE FONTS
- CENTRONICS PARALLEL or RS232 INTERFACE

You Pay Only —CALL $—

TOLL FREE
800-257-6170

In New Jersey
609-424-3900

Rainbow™

P & P CORPORATION
P.O. BOX 362 • MARLBORO, N.J. 07746

✓294

NEW TRS-80 SOFTWARE!
From Single SOURCE Solution™

Single SOURCE Solution brings the TRS-80 owner new innovative software at the most reasonable prices in the industry. Unless specified, software is available on all models.

TRSFLOW™ 1.1 — ONLY $59.95

TRSFlow™ 1.1 — is a hydraulic model based upon the popular Hardy-Cross method of pipe network analysis. By telling the program certain system parameters such as the length, diameter and type of pipes, **TRSFlow™** calculates head values at up to 150 pipe junctions and the flows through 150 system elements. Within the 150 system elements, **TRSFlow™** can handle 10 pumps and 10 fixed head conditions. **TRSFlow™** allows the system designated to accurately determine pump and pipe sizes in any desired network. **TRSFlow™**, works with level II **Basic** on **TRSDOS**.

FPSS™ — FINANCIAL PACKAGE FOR SERVICE STATIONS — ONLY $249.50

FPSS™ — is a complete financial and bookkeeping package for Retail Petroleum Service Stations. **FPSS** is written in Microsoft **Basic*** for the **TRS-80** Model III. **FPSS™**, which includes a 90 page detailed User's Manual, offers specialized accounting modules tailormade for the retail petroleum industry. **FPSS™** is menu driven, keeps track of each sale, purchase, charge and collection of a service station, with daily, weekly, monthly or annual reports at the user's command. Inventory control is especially detailed, allowing for determining gasoline leakage. Commissions to employees can be tracked with two commission rates setup.

TRS-ED VERSION™ 2.1 — ONLY $29.95

TRS-ED™ Version 2.1 — is an ideal text editor for the personal computer owners who don't want a major course in word processing. A variety of different kinds of printers may be used. **TRS-ED™ 2.1** provides features not available anywhere else at any price. Four different printed character methods may be chosen from, and the lower case conversion kit is not necessary unless you want to see in advance what you print. Commands are all single keyed. **TRS-ED™ 2.1** is written in **Basic**. A handy command card is included for easy reference.

BISPLAN — $59.95

BISPlan™ — is a program for making business plans and projections. With **BISPlan™** you are led through screen prompts to enter data concerning your business plans. You can enter estimates of a business proposal that you are considering and produce projections of potential earnings. **BISPlan™** will help you assess financing requirements, loan payoff rates, length of time before return on investment, and profit potential. Estimates can be projected up to five years, and dumped from screen to line printer. **BISPlan™** is menu driven and includes a manual. Available in 16K for the Model I with a more extensive version in Models II and III.

CONCRETE — $19.95

Concrete — is a series of programs that allow owners of the pocket computer to calculate the material necessary for concrete work. The first program, **Cement**, is for figuring the amount of cement, sand and gravel necessary to build any given project. The second program, **Steel**, will determine the linear feet of reinforcing steel needed and its weight in metric tons. The third program, **Earth**, is for figuring the amount of earth which must be removed from a construction site in order to build footings, basements, etc.

Mail your order for any of the above software directly to: Single SOURCE Solution, 2699 Clayton Road, Concord, California 94519 or call (415) 680-0202.

✓458

TRS-80 MODELS I OR III, 32K, 1 DISK DRIVE

Your personal money manager, DOUGHFLO!

Doughflo is a complete accounting system that grows as you need it — **FEATURING:**

- ✓ Excellent for use as a general ledger, tax preparation system, or accounts payable system
- ✓ Reports which compare totals from up to 24 months. Automatically form income and expense averages, and budgets
- ✓ Interactive checkbook balancing while expenses are being entered. Complete check-writing logic customized to your own checks
- ✓ Versatile report generator searches and lists all totals and balances
- ✓ User friendly documentation — includes sample data ready to run.

Pay your bills, and gain valuable insight. Create a complete financial data base for your home or office. **$79.95 complete.** Demonstration disk available for $12.00 postpaid, to be put towards future purchase. For more information check reader service number. Specify Model I or III.

✓112

"A Perfect Cload Every Time"*

*From a review in September/October 1980 Elementary Electronics. Reprints available.

TRS-80 TAPE DIGITIZER ► $49.95!

At last there is a cure for TRS-80 tape cloading blues! For over three years, Alphanetics has been selling the TRS-80 Tape Digitizer, a proven hardware solution for your software problems. No longer need you juggle the recorder's volume control endlessly, trying for a perfect cload of a pre-recorded program. Just pop the tape into the cassette recorder, process the signal through our digitizer, and you're ready to RUN a perfect load!

Just check out the Tape Digitizer's features:

- ✓ **Makes tape program loading virtually independent of volume control setting.**
- ✓ **Allows copying system and normal tapes without using computer.**
- ✓ **Makes a perfect digital copy of any tape without using computer, removing hum, noise, and cures minor dropouts.**
- ✓ **Cassette switch allows manual control of cassette recorder, independent of computer control.**
- ✓ **"GOOD DATA" indicator easily enables setting proper volume . . . doubles as a tape monitor.**
- ✓ **A.C. powered — no batteries to replace.**
- ✓ **Housed in a sturdy, attractive metal case.**
- ✓ **Completely compatible with Level I & II, also LOW speed (500 baud) Model III.**

Feed your cassette to the Alphanetics Tape Digitizer and feed your computer the exact digital waveform the TRS-80 gave your tape. Get rid of your tape bugs today — $49.95 postpaid to continental North America, or return within 10 days for a full refund!

✓113

We welcome Visa or MasterCard.

alphanetics

Box 597, Forestville, CA 95436
24 hr. phone (707) 887-7257

✓See List of Advertisers on page 338

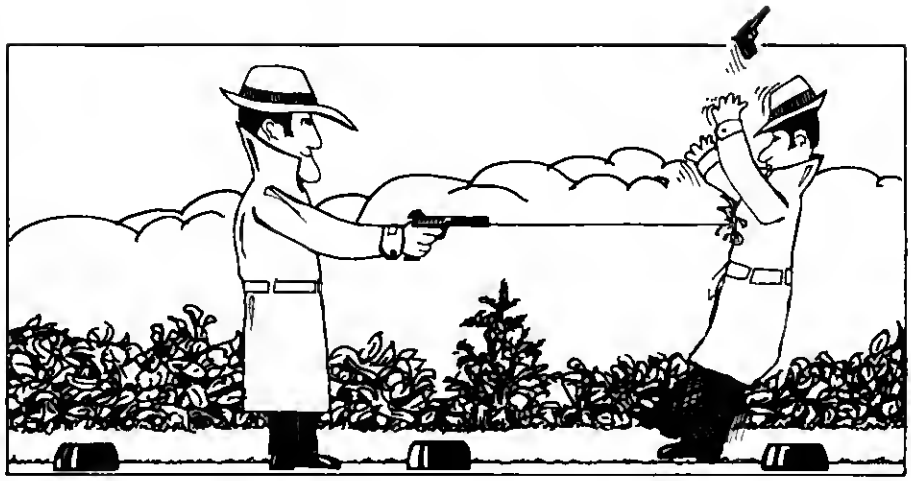
hits. If it is successful, any markers carried by the ambushed player are turned over to the ambushers. The attack is made while the unsuspecting player is moving to complete his turn. The attackers announce "ambush!" and carry out their attack.

● When all designated mission markers have been collected by the teams the game is over. The mission markers count as one point each. Base of operations markers count five each. The team with the highest point total wins. Remember: To claim a mission marker, the team must be able to make it back to their base of operations with the marker. It is not as easy as it may seem.

● As in Spy Versus Spy, players may not move past other players—teammates included. Players can only occupy the same marker during the forming of the spy team. If one team member's route is blocked the second member must move the distance necessary so that the total distance moved by both players is equal to the combined dice roll. In the event that both team members are blocked, both team members must move as far as possible and forfeit the next turn.

That's about it. So gather up an armful of water pistols or whipped cream, don your 007 garb and have at it! ■

Formerly an Eagle Scout and Vietnam vet (ARTY 1969–1970), Barry Adams is an environmental chemist for NC's water pollution control agency.



Line Number	Program Section
200	Program setup
580	Spy Versus Spy menu
780	Spy Versus Spy mission update
880	Spy Versus Spy assignment summary
980	Spy Versus Spy mission record
1340	Rendezvous mission marker assignments
1420	Rendezvous assignments
1550	Rendezvous spy team roster
2410	Player turn sequence
2480–3100	LPRINT Block

Table 1. LPRINT option line numbers

CANADA
Don't be left out in the COLD!!

You can now order direct! The most popular games, utilities and business programs!

TRS - 80* **ATARI*** **PET*** **APPLE***

Apparat NEW DOS - 80 2.0 (Model I/III)

NEW Canadian Payroll (Model II) 299.00
User defined General Ledger 299.00
or $499.00 set

*REGISTERED TRADEMARKS
SEND 3.00 FOR CATALOG - REFUNDABLE WITH PURCHASE
DEALER INQUIRES WELCOME

Rainbow Software Services Ltd.

7070B FARRELL ROAD S.E.,
CALGARY, ALBERTA T2H 0T2 PHONE: 253-6142

Peripherals
- disk drives
- Epson printers
- cables
- books
- magazines
- green screens
- ribbons
- Joy sticks
- Storage boxes
- Skyman
- Mikee angelo

TRS 80 Color
Spectral Associates
- Meteroids
- Space War
- Space Intruders

Corn Soft Group
- Color Scarfman
- Chromasette

Modem - 80
- auto dial/answer
- with software
- no RS 232 required

$359.00

460

BIG 5 ADVENTURE INTERNATIONAL CLOAD SSM FANTASTIC SOFTWARE SUB-LOGIC

★ ★ ★ ★ NOTICE ★ ★ ★ ★

PROGRESSIVE ELECTRONICS

is now authorized

SALES and SERVICE

for

MICRO DESIGN PRODUCTS

	M-1 Expansion	M-3 Expansion	Phone Modem
	MDX2	**MDX3**	**MDX4**
Board & Manual	$74.95	$74.95	$29.95
Parts Kit	$205.00	$205.00	$40.00
Assembled & Tested	$399.95	$324.95	$99.95

Aluminum Enclosures for the MDX2 $45.00

MIII Internal Drive Installation Kit $119.95

includes Power Suppy. Cables. Mounting Brackets

643 E CHESTNUT ST
LANCASTER OH 43130 ✓143
614/687-1019 hrs 9-9 EST

EVERY DAY MORE PEOPLE LEARN THE NAME OF THE ONE SOFTWARE COMPANY THAT MORE COLOR COMPUTER OWNERS HAVE GOTTEN SOFTWARE FROM THAN ALL THE OTHER COMPANIES COMBINED: THE ONE COMPANY THAT HAS GIVEN AWAY THOUSANDS OF FREE PROGRAMS THAT ARE SUPERIOR TO SOME YOU MIGHT PAY FOR!

ISN'T IT TIME YOU KNEW TOO?

ILLUSTRATED MEMORY BANKS: IMB WILL SEND YOU A SHORT SAMPLE PROGRAM & OUR NEW COLOR EXT. BASIC SOFTWARE LIST WHEN YOU SEND US A BUSINESS SIZED SASE.

COLOR **WORDCLONE**

Color WordClone makes word processing simple. This program can be used with tape or disk and provides you with real UPPER and LOWERCASE letters with descenders (plus 50 letters by 24 lines on the screen at one time!) Why pay more when this is all you really need? JUST $18.95 SUPPLIED ON TAPE. (Min. 16K Ext. Basic). USER MODIFIABLE !!!'

$18.95

$18.95 EACH

16K Extended Color Basic Tape Programs
CREATAVADER - create your own targets or choose from a menu of predesigned 4 color targets.
GATOR ZONE - battle against alien 'preppy gators' before they eat your shirts. (IMB original).
KOSMIC KAMIKAZE - our best selling hi-res., deep space arcade game which THE RAINBOW called '..the best spaceship graphics we have seen in a non-machine language program.'
many more titles available, including STAR SIEDE PLUS, GALLOPING GAMBLERS, SELECT-A-GAME, STARBASE ATTACK, METEOR STORM, plus new releases coming.

IMB illustrated memory banks
P.O.BOX 289
WILLIAMSTOWN, MA. 01267-0289

VISA & MASTER CARD ACCEPTED.
CALL (413) 663-9648 3-7 PM EST.

SPECIAL OFFER: Mention this magazine ad and select a FREE program for every two programs you order !! ✓274

SOFTWARE CONCEPTS
DALLAS TEXAS

AVIATION PROGRAMS
- Pilot Flight Planning
- Financial Trip Information
- Flight Plan Revisions
- Determination of optimum altitude
- Area Navigation
- Course Reversal
- IFR Alternate
- Great Circle Courses
- Cost Projections
- Cash Flow
- Weight & Balance
- More

Aviation (Model fII disk only)..... $99.00

RETAIL INVENTORY CONTROL
- Maintain Inventory
- Sales Register
- Full Editing
- User Configured
- Track Backorders
- Tracks Re-order Time
- Prints Purchase Orders
- More

Retail Inventory (Mod I/III Disk) $99.00
With Cash Register Module $148.00

THE DISASSEMBLER
- Disassemble Command Files
- Generate EDAS Source Code
- Insert User Defined Labels
- Generate ORG's & EQUates

The Disassembler (MOD I/III Disk)..... $39.00
EDAS..... $75.00

ELECTRA SKETCH
- Screen Graphics
- Mix Graphics & Text
- Dump Screen to MX-80
- Movie Display Mode
- Load Screens Fromom BASIC
- Instant Recall of Screens
- More

Electra Sketch (Mod I/III Disk)..... $29.00

FINE LINE
- Graphics Drawing in COLOR!
- Movie Mode
- Save screens to Tape

Fine Line (Color 16K Tape) $34.00

(Most TRS software available at similar discounts. CALL!)

SOFTWARE CONCEPTS
105 Preston Valley Shopping Center
Dallas, Texas 75230

Our retail store is located at the SW corner of Preston & LBJ

(214) 458-0330

MasterCard, Visa, American Express, COD ✓43

✓See List of Advertisers on page 338

Twenty-one graphic programs for your CC.

The Colorful Computer—Part I

Franklyn D. Miller
8871 Falmouth Drive
Cincinnati, OH 45231

This is the first of three articles illustrating the great versatility of the Color Computer's graphics functions. In "A Better Basic" (*80 Micro*, June/July 1982) I described the Extended Basic instruction set for the Color Computer.

In this article I will describe several graphics commands in more detail and present short (mostly less than 500 bytes) programs to stimulate others from the readers of *80 Micro*. These are a mixture of original programs and Model I programs (from *80 Micro*) rewritten for the Color Computer.

The Key Box

Color Computer
16K RAM
Extended Color Basic

Included are programs in very low resolution (VLR), medium resolution (MR) and very high resolution (VHR) graphics, since all present possibilities for artistic and practical expression.

Because of the advertised nature of the Color Computer and because I stress its graphics capabilities, do not be misled into thinking it is a toy useful only for playing games. With a disk system it is the equal of a Model I or III, although not the same. The Color Computer has many features they lack, and lacks some features available in the others.

Possibilities are endless for the use of computer-generated patterns in designing fabrics, clothing, wallpaper and book covers. You could use a camera and in the course of an evening record a dozen colorful designs from a single program. You might even develop hundreds of colorful patterns by program alterations. There are limitations in the number of colors available, but the potential is still overwhelming.

In this first article I will illustrate the Line function as one way to create beautiful patterns in color. Other graphic functions such as Color, Set, PSET and PMODE will also be included. If you are unfamiliar with the Color Computer you will find the speed of execution of some of these instructions startling.

Color Computer Set

In VLR a screen position is composed of four pixels (not six as in the Model I) for a total of 2,048 coordinates. The format for SET is:

SET (X, Y, C)

where X and Y are coordinates and C is a number from zero to eight designating the desired color. X may vary from zero to 63 and Y from zero to 31. The colors are black (zero), green (one), yellow (two), blue (three), red (four), buff (five), cyan (six), magenta (seven), and orange (eight). Because the pixels are so large, only rather crude graphics can be drawn.

One example of Set is in Program Listing 1 (Chevron). Note that Set is very similar to Level II graphics except for the color designation and the resolution. The CLS0 in line 10 clears the screen to a black background instead of a green one. (The screen can be cleared to any of the nine colors noted

```
10 REM LISTING 1  CHEVRON
20 CLS0:Y=0:R=0
30 R=RND(8):S=RND(6):IFR = S THEN30
40 FORX=0TO40STEP20
50 FORI=X TO X+10
60 SET(I,Y+R,R):Y=Y+1
70 NEXTI:Y=R
80 NEXTX
90 FORX=10TO50STEP20
100 FORI=X TO X+10
110 IFY+10+R>31THEN190
120 SET(I,Y+10+R,S):Y=Y-1
130 NEXTI
140 Y=R
150 NEXTX
160 R=R+1:IFR>10THEN190
170 Y=R
180 GOTO30
190 GOTO190
200 REM MEM = 272
```

Program Listing 1. Chevron

```
10 REM LISTING 2  PATTERNS
20 CLS0:A=10:B=7:S=0:DIMA(7),B(7)
30 T=RND(73)+162:FORJ=0TO7:A(J)=J:B(J)=J:NEXT
40 FORJ=0TO7:R=RND(8)-1:W=A(J):A(J)=A(R):A(R)=W:NEXT
50 FORJ=0TO7:R=RND(8)-1:W=B(J):B(J)=B(R):B(R)=W:NEXT
60 FORJ=0TO7:FORK=0TO7:R=A(J):W=B(K):C=R+W+T:X=A+R:Y=B+W:GOSUB16
0
70 Y=B-W:GOSUB160:Y=B-W:GOSUB160:X=A-R:GOSUB160:Y=B+W:GOSUB160
80 X=A+W:Y=B+R:GOSUB160:Y=B-R:GOSUB160:X=A-W:GOSUB160:Y=B+R:GOSU
B160
90 NEXTK,J
100 CLS0:N=128:M=64:FORJ=1TORND(20)+10:R=RND(17)*2:W=RND(M)
110 T=S:IFRND(0)>.0THENT=T+2
120 A$=CHR$(N+W)+CHR$(N+W):PRINT@S,A$;
130 FORK=T TO S+509 STEP R
140 PRINT@K,A$;:NEXT:NEXT
150 GOTO30
160 A$=STRING$(3,C)
170 PRINT@S+32*Y+3*X,A$;:RETURN
180 PRINT@S+32*Y+3*X+2,CHR$(C);:RETURN
190 REM MEM = 573
```

Program Listing 2. Patterns

QWERTY
DAISYWHEEL II

At last! QWERTY 3.0 is available for the DAISY WHEEL II! Finally, owners of the Daisy Wheel II can make their printers do what they were **designed** to do. Produce scores of special symbols and accents! Add footnotes and borders to text! Bold print, double underline, even underline spaces! Print superscripts and subscripts, simultaneously! Print a single page of text without resorting to copy-markers! Stop printing to change wheels or insert text!

Once you use DAISY, you'll wonder how you worked without it. We **guarantee** you will agree! If not, return DAISY within fourteen days for a prompt refund. That's how confident we are!

DAISY FEATURES

Easy transition between the three print pitches. One command changes pitch and resets formats for optimum appearance in that pitch.

Over 100 new symbols, including foreign language accents, Greek letters, and mathematical symbols, all using the standard Courier wheel. Allows tildes, carats, and overbars to be placed over any character.

Any character can be used as a superscript or subscript, singly or simultaneously. Extra high superscripts for integrals. Fine space controls to make superscripts and subscripts look perfect.

Underlining, double underlining, and bold printing, with our without underlining of spaces.

Special provision for printing ratios of one long expression over another (as in algebra).

Provision for putting FOOTNOTES on a page in such a way that they remain on that page despite later editing.

TABLE and MABLE commands enable exact positioning of the print head anywhere on the line. Invaluable in printing neat data tables, columnar material, etc.

PRETTY command enables one to print repetitions of a chosen character; combined with TABLE or MABLE, it becomes easy to produce attractive borders, even in headers and footers.

PAGE END allows the user to discover where pages will end, when they are printed, without actually printing.

Special commands allow the printing of a single page anywhere in the text, with correct page number, footer, and header, without the use of copy-markers. A special command will reset the default format parameters, to allow use of copymarkers without having to insert a format line to adjust for format changes.

FOLIO format enables one to produce print-outs in two or three columns per page, as for newsletters, indices, etc. FOOTNOTES, footers, headers, and PAGE END will work correctly.

Access to disk directory and ability to kill files from within DAISY, without losing any text.

Special code in the text will stop printing until user restarts it; use it to change print wheels. One can insert up to 60 characters of text at this point, as for form letters.

Special print-outs allow one to keep records of DAISY commands used to create a certain effect.

Flaws in SCRIPTSIT's widow supress are corrected. SCRIPSIT's problem with typing two spaces after a period is fixed. SCRIPSIT's scrolling speed is doubled, with instructions for user modification.

CAUTIOUS BUYERS: We invite you to buy the DAISY manual. This is without a doubt one of the clearest, most well-written manuals ever produced for **any** piece of software. Over 110 pages. **Indexed.** In a custom 3-ring binder. We will credit the full $10.00 price when you decide to buy DAISY.

DAISY REQUIRES: A TRS-80 Model I or Model III with 48K, at least one disk drive, and a copy of **Model I SCRIPSIT.** Please specify which machine and how many drives in your system.

QWERTY 3.0 is also available for the Centronics 737, 739, and Lineprinter IV.

DAISY complete package	**$74.95**
DAISY manual alone	**10.00**
QWERTY 3.0 complete package	**74.95**
QWERTY 3.0 manual alone	**10.00**

Please add $2.00 for shipping and handling. Add $4.00 for first class postage or UPS. Overseas orders add $4.00 for surface mail, $12.00 for air mail.

MED SYSTEMS SOFTWARE
P.O. BOX 3558 CHAPEL HILL, NC 27514
TO ORDER, CALL 1-800-334-5470

above by CLS C, where C is a number from zero to eight.)

You cannot set pixels within a block or position to different colors. The last pixel set takes precedence and resets all others to the last color specified. In other words, if Y equals 10 and X1 equals 10 and X2 equals 10 and you wish to Set X1 to blue and X2 to orange, when X2 is Set orange X1 will be reset to orange.

When CHR$ is used or if graphics characters are POKEd to the screen, the all-pixels-off numbers are 128, 144, 160, 176, 192, 208, 224 and 240. Fifteen different characters are available with eight colors for each and eight black blocks of four pixels each. CHR$(255), for example, is all pixels on—orange.

If in Set graphics we represent a block as four pixels, they should be numbered as shown:

8	4
2	1

To calculate the appropriate number for the desired character (for example, ▛ in green), we proceed as follows: 128 plus 8 plus 4 plus 1, or 141. CHR$(141) will light the three green pixels eight, four and one. POKEing a location with 141 accomplishes the same end. The base number for green is 128. For each subsequent color add 18, or use the black blocks as the base numbers instead of 128. Listing 2 (Patterns) is an example of the use of strings and CHR$ to produce rapid, colorful patterns. Listing 3 (Poke) is a similar program using POKEs.

Listing 4 (Strings) stores the screen contents in strings for later retrieval or for storage on disk or tape. VARPTR is not the same pointer in Color Basic as it is in Level II and Disk Basic. VARPTR returns a number which points to a five-byte description of a string (see Table 1).

```
10 REM LISTING 3 POKE
20 CLS0
30 S=128:SC=1024:A=145
40 D=RND(8):E=RND(8)+7
50 FORI= 0 TO E STEP2
60 K=SC+(I-1)*32:L=SC+I*32
70 F=RND(30):G=RND(15)+15
80 FORJ= F TO GSTEP2
90 POKEK+J,A:POKEK+J+1,S
100 POKEL+J,S:POKEL+J+1,A
110 NEXTJ,I
120 A=S:S=RND(127)+128:GOTO40
130 REM RANDOM POKE3
140 CLS0
150 C=RND(128)+128:IFC/16=INT(C/16)THEN150
160 FORA=155TO1STEP-1:FORB=1024TO1535STEPA:POKEB,C:NEXTB:CLS0:NE
XTA:RUN
170 REM MEM = 346
```

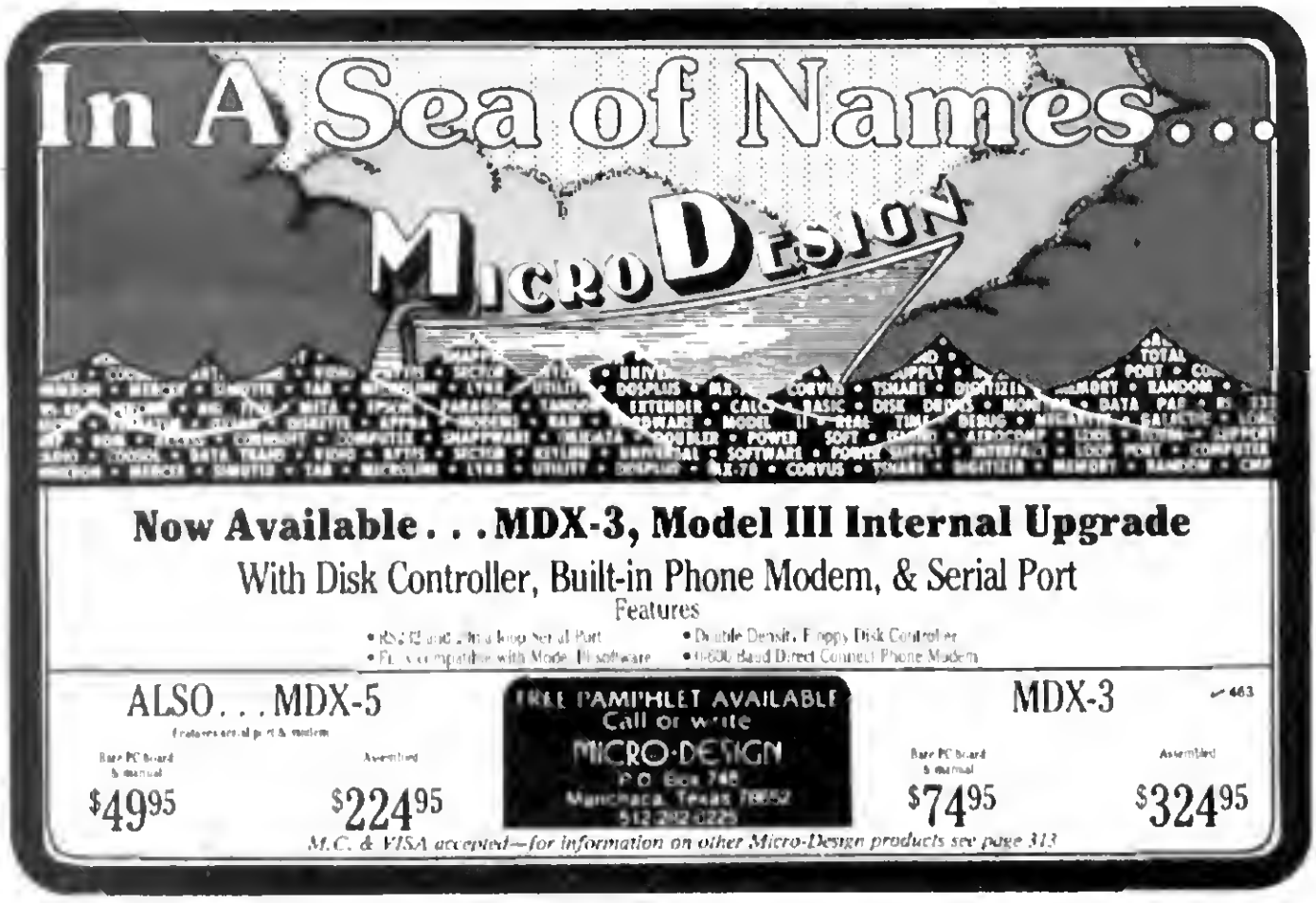
Program Listing 3. Poke

Line 50 POKEs the string length (32) into the first byte to which VARPTR(T$) points. (There are 32 locations for each screen line.) Line 70 POKEs the left screen location into VARPTR locations three and four of T$. This method is faster than reading a whole line and concatenating the characters, as is usually done. The contents of T$ thus reside in the memory locations on the screen (pointed to by VARPTR).

The string manipulation in line 80 is necessary so T$ and T$(J) do not continue to point to the screen at the end of the program or after a screen change. Otherwise, they would contain the screen contents at that location no matter what is on the screen. As a result, the string array would contain garbage when you next tried to use it.

Line 80 forces Basic to rearrange the string area so the strings are transferred to a different location in high memory. This method permits storage of the screen fairly rapidly. Try taking out line 80 and see what happens to your string arrays.

Additional commands may be added af-



KAIV

WARRIORS of RAS, Volume II

by Randall Don Masteller

The saga continues. As a lone Warrior of RAS, you dare to enter the KAIV in quest of an exquisite treasure buried deep within the catacombs. Not only will you need torches, food, water and climbing skill to survive, but you must find and master the powers of magic wands, potions, and rings of sorcery. And you must defend yourself against the scores of hideous creatures that seek to make you just another heap of bones in a lonely corner of . . . the KAIV.

NEW! CASSETTE VERSIONS FOR 48K . . . $29.95!

Warriors of RAS is a role-playing series, written in machine language, with graphics. Games can be saved as well as the characters you become. Characters may be used interchangeably between volumes 1, 2 & 3.

MODEL I OR III, 48K

VOLUME 1, DUNZHIN	— Disk Album $29.95
VOLUME 2, KAIV	— Disk Album $29.95
VOLUME 3, THE WYLDE	— Available July 15.

AT YOUR LOCAL DEALER, OR CALL 1-800-334-5470

MED SYSTEMS SOFTWARE · P.O. Box 3558 · Chapel Hill, NC 27514

```
10 REM LISTING 4 STRINGS
20 CLS0:CLEAR600
30 DIM T$(15)
40 FORI=0TO14:FORJ=0TO31:PRINTCHR$(128+RND(127));:NEXTJ,I
50 T$="":V=VARPTR(T$):POKEV,32
60 FORJ=0TO15
70 S=1024+32*J:B=INT(S/256):L=S-256*B
80 POKEV+2,B:POKEV+3,L
90 T$(J)=LEFT$(T$,31):T$(J)=T$(J)+RIGHT$(T$,1)
100 NEXT
110 FORI=1TO1000:NEXT
120 CLS0
130 FORI=0TO1000:NEXT
140 FORI=0TO14:PRINTT$(I);:NEXT
150 GOTO150
160 REM MEM = 290
```

Program Listing 4. Strings

Byte No.	Description
1	String length
2	Not available to the user
3	Address of first character
4	Address of first character
5	Not available to the user

Table 1

ter line 80 to use T$(J) in any fashion you wish. I have included a few lines as an illustration. You may, of course, save any part of the screen in a suitable string array with proper identification of the screen locations. Once strings have been built up by concatenation or by using this method, filling the screen with graphics becomes extremely fast. In this case, the screen can be cleared and reproduced in .23 second, including the time Basic requires to manipulate Timer. The actual execution time is probably less than .2 second.

Line

Next let us examine the Line command in some detail. Its execution is extremely fast; a line is drawn in the blink of an eye compared to Level II's laggardly pace. The format for Line is:

LINE (X1, Y1) – (X2, Y2), PSET, BF

where X1, Y1 and X2, Y2 are the coordinates of any two points on the screen (B and F are optional). The coordinates may vary between X1 equals zero to X1 equals 255 and Y1 equals zero to Y1 equals 191, depending upon the resolution you require.

Preset will reset a line to the background color—erase it. VLR graphics displays 2048 pixels. VHR graphics will produce 49,152 pixels, while Model I and Model III provide only 6144 pixels. You may also use a resolution of 24,576 or 12,288 pixels. The largest number of pixels can tax the resolution of a standard television set (and that of the human eye). As resolution increases, a straight line looks less and less like a staircase.

In addition to drawing lines, Line will also draw squares or rectangles and fill them with a solid color. If the X1, Y1 and X2, Y2 coordinates are the opposite corners of a square or rectangle, Line draws a complete box when the B option is selected. Listing 5 (Boxes) is a simple illustration which can easily be written in one line, since Color Basic allows up to 255 characters per program line. By adding an F to the B, you may fill the area with a solid color. Unless specified otherwise by Color, the foreground color will be used.

Listing 6 (Lines) illustrates the use of MR graphics. In PMODE1, 12,288 pixels are available—one-fourth as many as in HR graphics. Screen 1,0 selects the first four colors mentioned above by the use of the

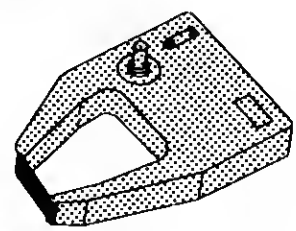
DISCOUNT PRINTER RIBBONS

40% OFF!! OR MORE!

Brand New, Top Quality, Exact Replacement Ribbons & Cartridges. These Ribbons Produce **Super Jet** Black Impressions and Ultra Reliable Print Life. They Are Delivered to Your Door Promptly for Much Less Than Most Retail Stores

★SPECIAL! BUY 10 and GET ONE FREE!

YOUR PRINTER	PACK SIZE	RETAIL LIST**	YOUR WHOLESALE PRICE		SIZE	COMMENTS	CAT. ORDER #
ANADEX 9000 Series	1 pk	14.00 ea	14.00	(14.00 ea)	500	Nylon Jet Blk	C-737
CENTRONICS 700-703, 737, 779	3 pk	18.95/3 pk	11.95/3 pk	(3.98 ea)	563" x 45"	Nylon Jet Blk	C-700
CENTRONICS 100, 101A, 102, 103, 300, 301, 306, 308, 330, 358, 398, 500, 501, 503, 508, 588, 620, 820	3 pk	26.33/3 pk	17.55/3 pk	(5.85 ea)	1" x 108"	Nylon Jet Blk 5 mil High Speed	C-100
CENTRONICS 704-705	1 pk	16.95 ea	13.95/Giant Cart	(13.95 ea)	5.16" x 210"	Giant Cart	C-7045
DEC ½ x 40YD	3 pk	17.77/3 pk	12.95/3 pk	(4.32 ea)	1.2" x 120	Double Spools	R-600
DEC ½ x 80YD	3 pk	20.12/3 pk	14.25/3 pk	(4.75 ea)	1.2" x 180	Double Spools	R-644
DIABLO HYTYPE II (M/S BLK) HI YIELD FITS 70 PRINTERS*	1 pk	9.31 ea	6.87 ea	(6.87 ea)	5.16" x High Yield	300,000 plus imp	C-511
EPSON MX70 80	1 pk	16.00 ea	16.00 ea	(13.95 ea)	500 x60	Nylon Jet Blk	C-522
IBM - "SILVER DOLLAR" Sys 34, Sys 32 MDLA, Series I MDL4974, 5256, 3287, 3770 3771-3774, 4974, 5100, 5103, 5110, 5228, 5256, 5320MDLA	5/pk	5.80 ea	14.90 5 pk	(2.98 ea)	9.16" x 30"	Nylon Jet Blk	R-300
IBM - HARMONICA ½" SERIES I MOD 4973/II, 3200, 3289, MOD 2	3 pk	9.42 ea	20.85/3 pk	(6.95 ea)	1.2" x 108	Nylon Jet Blk	C-350
NEC SPINWRITER	4/pk	23.40/3 cart	23.60/4 pk rb reload	(5.90 ea)	1.2" x 51"	Nylon/Ex Lng Life	R-400
QUME (FITS 80 PRINTER MODS)	3/pk	18.00/3 pk	13.95/3 pk	(4.65 ea)	1.4" x 310	Multistrike Film	C-525
RADIO SHACK DAISY WHEEL II	1 pk	24.95 3pk	8.25	(8.25 ea)	250	Mylar Multistrike	C-789
RADIO SHACK LPIII, LPV	one pk	13.95/cart	8.95/Reload rb* only	(8.95 ea)	500" x 45	Nylon Incl Instr	R-T3
RADIO SHACK LPIII, LPIV	3 pk	18.95/3 pk	11.95/3 pk	(3.98 ea)	563" x 45	Nylon Jet Blk	C-700
TELETYPE MOD 33, 28, 35, 37, 38, 88	10 pk	2.40 ea	13.90/10 pk	(1.39 ea)	1.2" x 36"	Nylon Jet Blk	R-450
WANG M'S 5541W, WC, 5581, WD, 8581W, 2281W	1 pk	8.85 ea	5.95 ea	(5.95 ea)	5.16" x 393	Multistrike Film	C-550



TERMS:

MINIMUM PURCHASE - **$20**
PAYMENT BY: C.O.D. (UPS), CHECK, MASTER CARD, OR VISA CHARGE CARD.
VOLUME DISCOUNTS:
20 - 50 PACKS **10%**
51 - 100 PACKS **15%**
*UNDER $20, ADD $5 HANDLING.
**APPROX. RETAIL. PRICE VARIES.

ANCIE LABORATORIES
5200-J Philadelphia Way 301-345-6000 (Wash D C Local)
Lanham, Maryland 20706 301-792-2060 (Balto MD Local)
800-638-0987 (National)

NAME_____
ADDRESS_____
CITY_____STATE_____ZIP_____

QTY CAT.# AMT.

☐ Check Enclosed
☐ C.O.D.
☐ VISA
☐ MASTER CHARGE
ACCT. # _____
EXP. DATE _____
MIN. ORDER $20
PRICES SUBJECT TO CHANGE

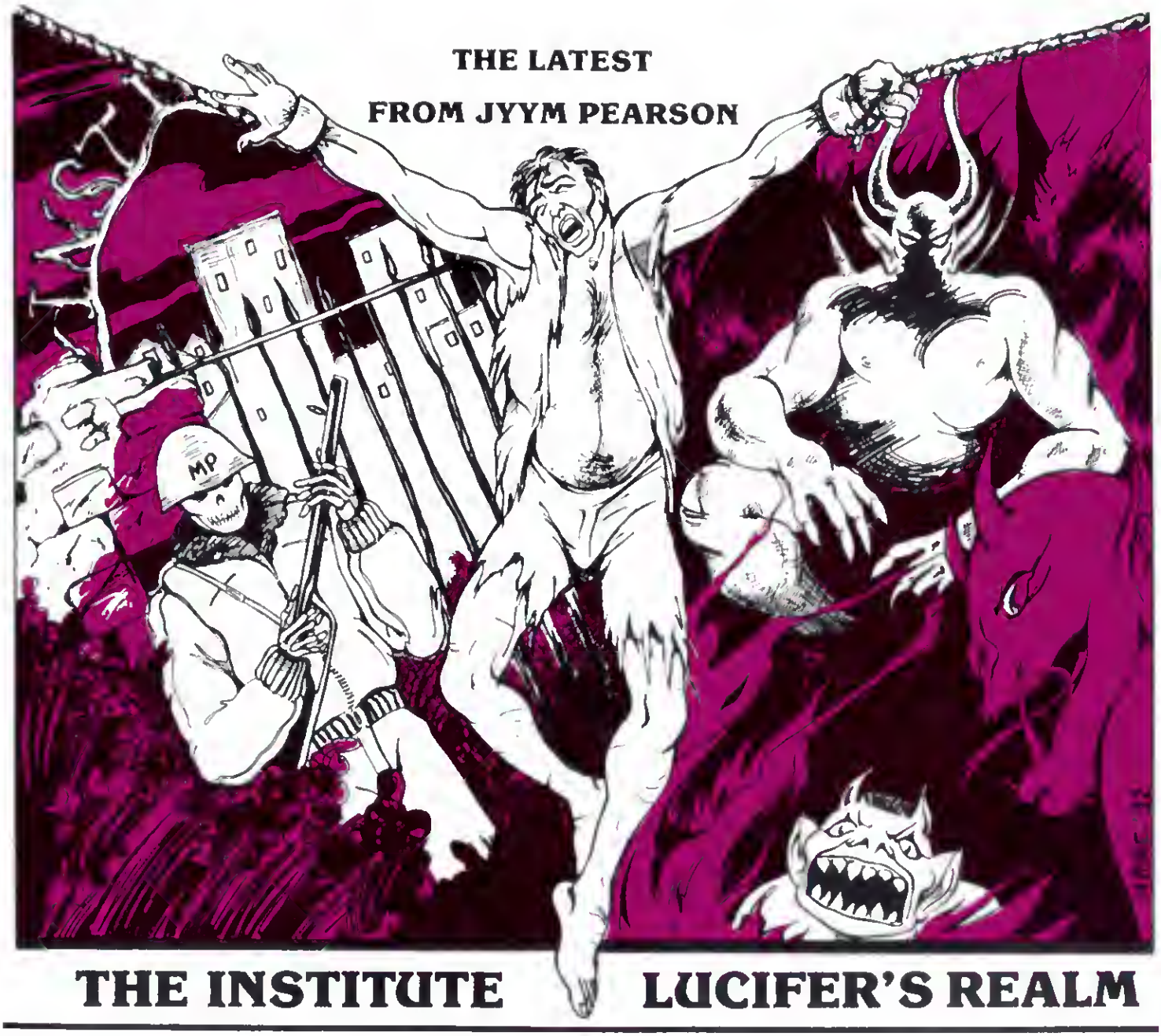
TOTAL _____

ANCIE Laboratories
5200-J Philadelphia Way
Lanham, Maryland 20706

✓ 284

301-345-6000 (Wash. D.C. Local)
301-792-2060 (Balto. MD Local)
800-638-0987 (National)

Scanned by Ira Goldklang - www.trs-80.com



THE INSTITUTE

The Institute is not just one adventure, but five games in one! You must negotiate not only the institution itself, but four other scenarios you reach through your dreams. A forest dominated by a huge statue, a prehistoric forest, an ancient temple, and the Titanic ocean liner all conceal objects and clues to help you escape the nightmare of the Institute.

The Institute TRS-80 Model I/Model III 16K
Cassette . . . . $19.95 Diskette $22.95

LUCIFER'S REALM

Lucifer's Realm: Entering the kingdom of Satan, you discover a revolution in the making, headed by Adolf Hitler. You must travel through the bowels of Hades, dealing with the most evil mortals of all time. By cunning and strategy, you can bring Hitler to his final doom and find your escape from the fiery Pit.

Lucifer's Realm TRS-80 Model I/Model III 16K
Cassette . . . . $19.95 Diskette $22.95

MED SYSTEMS SOFTWARE
P.O. BOX 3558 CHAPEL HILL, NC 27514
TO ORDER, CALL 1-800-334-5470

```
10 REM LISTING 5 BOXES
20 FORK1=0TO1
30 PCLS:FORK=1TO4
40 PMODEK,1
50 SCREEN1,K1
60 R=0
70 FORI=1TO35
80 LINE(250-R,100-R)-(225-R,150-R),PSET,B
90 R=R+4
100 NEXT
110 FORL=1TO1500:NEXT
120 NEXTK
130 NEXTK1
140 GOTO140
150 REM MEM = 170
```

Program Listing 5. Boxes

```
10 REM LISTING 6 LINES
20 PMODE4,1
30 PCLS
40 SCREEN1,1
50 X=RND(255):Y=RND(191)
60 LINE-(X,Y),PSET
70 FORX=1TO200:NEXT
80 GOTO50
90 REM MEM = 90
```

Program Listing 6. Lines

```
10 REM LISTING 7 WEAVING
20 PMODE1,1:PCLS:SCREEN1,1
30 I=0:J=0
40 PSET(I,J,7)
50 PSET(255-I,191-J,0)
60 I=I+1:IFI>255THENI=RND(50)
70 J=J+1:IFJ>191THENJ=0
80 GOTO40
90 REM MEM = 130
```

Program Listing 7a. Weaving

```
10 REM LISTING 7 WEAVING
20 PMODE3,1:PCLS:SCREEN1,P
30 Y=10
40 R=RND(4):S=RND(4):IPR= S THEN40
50 PCLSR:COLORS,0
60 FORX=0TO220STEP20
70 LINE(X,Y-10)-(X+10,Y+10),PSET
80 LINE(X+10,Y+10)-(X+20,Y-10),PSET
90 K=RND(4):IFK=R THEN90
100 COLORX,0
110 NEXT
120 LINE(240,Y-10)-(250,Y+10),PSET
130 Y=Y+10:IFY>104THEN150
140 GOTO60
150 FORI=1TO2000:NEXT:IPP=1THENP=0ELSEP=1
160 GOTO20
170 REM MEM = 209
```

Program Listing 7b. Weaving

```
10 REM LISTING 8 PLAID
20 P=0
30 FORN=1TO10
40 PMODE1,1:PCLS:SCREEN1,P
50 K=0:L=30
60 FORI=0TO220STEP30
70 R=RND(3)+5
80 COLORR,5
90 LINE(250-I,K)-(220-I,L),PSET
100 LINE(I,K)-(I+30,L),PSET
110 LINE(240-I,K)-(210-I,L),PSET
120 LINE(I+2,K)-(I+32,L),PSET
130 R=RND(3)+5:COLORR,5
140 LINE(244-I,K)-(214-I,L),PSET
150 LINE(I+6,K)-(I+36,L),PSET
160 R=RND(3)+5:COLORR,5
170 LINE(240-I,K)-(210-I,L),PSET
180 LINE(I+10,K)-(I+40,L),PSET
190 R=RND(3)+5:COLORR,5
200 IF206-I<0THEN230
210 LINE(234-I,K)-(206-I,L),PSET
220 LINE(I+16,K)-(I+46,L),PSET
230 NEXT
240 K=K+30:IFK>160THEN270
250 L=R+30
260 GOTO60
270 IFP=0THEN P=1ELSEP=0
280 FORZ=1TO2000:NEXT
290 NEXTN
300 GOTO300
310 REM MEM = 529
```

Program Listing 8. Plaid

zero. A one instead of a zero would select the second four colors. Screen 0 instead of Screen 1 would select VLR graphics. (Screen 0 is normally not used because the default is always Screen 0.) PCLS clears the screen and erases any graphics from memory. You may use PCLS C in a fashion similar to CLS C.

Pages

When you use P in Screen 1 or PMODE R, Basic assumes you are going to use a high resolution mode. (R refers to the mode and P to the page number.) There are five PMODES, zero through four. PMODE 0 and PMODE 1 have the same resolution but provide two and four colors, respectively (128 by 96 pixels each). PMODE 2 and PMODE 3 are of higher resolution, and also provide two and four colors (128 by 192 pixels each). PMODE 4 is the highest resolution (256 by 192 pixels) but provides only two colors: a black background with a white or buff foreground, or a black background with a green foreground. Buff actually turns out to be a rainbow of colors enhanced by "color-fringing" in most tv sets.

PMODE 0 requires one page of memory; PMODEs 1 and 2 require two pages and PMODEs 3 and 4 require four pages. Each page of memory uses 1.5K bytes of RAM. The default when the computer is turned on is four pages. You can change the number of pages available by using PCLEAR and a number from one to eight, since eight pages are possible with a 16K memory. Since all programs in this article require little memory, we merely accept the default. The second number in PMODE is the starting page used by Basic to store the graphics. Additional pages may be cleared and used to store graphics for animation purposes.

Back to Lines. Notice thet you are able to manipulate Color, PMODE and Screen arithmetically much as you can the Set function. In the Line instruction the PSET is mandatory.

Listings 7 and 8 (Weaving and Plaid) are two examples of the Line instruction in PMODEs 2 and 3 with four colors. The displays can be very beautiful.

Listing 9 (Four Node), in the highest resolution mode (PMODE 4), illustrates one of the many ways mathematical functions may be used to create designs. The program is based on one which first appeared in *80 Micro*.

Paint

Listings 10, 11 and 12 (Color, Color 2, Color 3) ere all variations on a theme. In two, the Paint command is used. Paint has the format:

PAINT (X,Y), C1, C2

Paint is used to fill large areas of the screen with a solid color. X and Y refer to coordinates anywhere within the area to be colored, and C1 designates the color. C2 tells Basic the bordering line at which to stop coloring. The bordering lines can be formed using Line, Circle, Drew or PSET.

Listings 14, 15 and 16 are variations of one program illustrating the use of PSET. Experiment yourself to make them more interesting. The format is identical to Set, except for the added P which is mandatory in high resolution. Because of the many pixels on the screen, PSET can be extremely slow in execution. Whenever possible, use a commend such as Line to set more than a few pixels.

INTRODUCING

THE MULTI-USE CHECK REGISTER ACCOUNTING SYSTEM
(It's completely user-oriented and menu-driven)

CHECK THESE COMPARISONS!

	Accom Money Manager Version 6.5	Tandy Checkwriter 80	The Business Division MAXI CRAS	Visiledger #011842
PRINTING				
Print continuous form checks?	No	Yes	Yes	Yes
Print single checks?	No	Yes	Yes	Yes
Check alignment test?	No	Yes	Yes	No
Print check stubs?	No	No	Yes	Yes with limited information
Print check register statement?	Yes	Yes	Yes	Yes
Print bank statement reconciliation?	Yes	Yes	Yes	Yes
Print income and expense subtotals?	Expense only	No	Yes	No
Print individual account statements?	Yes	No	Yes	Yes
Print check register notes?	No	No	Yes	No
Print account distribution statement?	No	No	Yes	No
Payee Address file for automatic printing of address on checks?	No	Yes	Yes	No
Number of payees	N/A	75	40 Mod I 75 Mod III	N/A
Number of lines in payee address	N/A	3	4	N/A
TRANSACTION ENTRY				
Check "In Pay of" file (for automatic printing of what check is for on checks)?	No	Payee only	Yes	No
Number of payees/payors in file	N/A	75	40 Mod I 75 Mod III	N/A
Distribute transactions over multiple accounts	Difficult	Difficult	Easy	Easy
Flag tax deductible items in any account?	Yes	No	Yes	Yes
User-friendliness	Good	Excellent	Excellent	Fair
Protection against user error	Good	Excellent	Excellent	Fair
Allow entry of manually written checks?	Yes	Yes	Yes	Yes
Ease of finding checkbook balance	Easy	Difficult	Easy	Easy
MISCELLANEOUS				
Supplied with DOS?	No	TRSDOS	TDOS	Mod I TDOS Mod III No
System	Mod I and Mod III	Mod III only	Mod I and Mod III	Separate Mod I or Mod III
Accept lower-case commands?	No	No	Yes	No
Accept lower-case text?	No	Yes	Yes	Yes
Self prompting?	Yes	Mostly	Yes	Mostly
Swapping of program diskettes required?	Yes	No	Mod I Yes Mod III No	No
VISICALC(tm)-compatible data?	No	No	Yes	No
Documentation quality	Fair	Excellent	Excellent	Fair
CAPACITIES				
Maximum amount per transaction	99999.99	99999.99	99999.99	Not listed in manufacturer's documentation
Maximum balance	99999.99	99999.99	99999.99	Not listed in manufacturer's documentation
Limit on deposits per day?	No	Yes — 1	No	No
Number of income accounts	1	1	Up to 223 total income and expense	Not listed in manufacturer's documentation
Number of expense accounts	Up to 99	Up to 30	Up to 223 total income and expense	Not listed in manufacturer's documentation
Limits on transactions	Mod I 100/mo Mod III 250/mo	2500/yr	Unlimited	Mod I 300/mo Mod III 2400/mo
Number of bank accounts	Unlimited no interaction	9 - with interaction	Unlimited no interaction	Unlimited no interaction

MAXI CRAS

The Last Check Register Accounting System You'll Ever Need

MAXI CRAS is the first and last Check Register Accounting System you'll ever need. Strong statement? Check out these features!

- Write checks by hand, or print automatically on single or continuous form checks. Alignment test makes sure each check is printed perfectly!
- Data entry routine second to none — saves time AND eliminates errors. You don't need to know anything about computers to use MAXI CRAS.
- The widest variety of reports available — complete check register, income and expense sub-totals, bank statement reconciliation, list of check register notes, and an account distribution statement.
- For even more detailed analysis, data is readable by VISICALC(TM). Compare!
- Checkbook balance is constantly updated and instantly accessible. No more embarrassing overdrafts!
- Write as many checks per month as you like. No limits like other systems!
- Handle up to 223 separate income **and** expense accounts. Most other systems only allow ONE income account.
- Assign a check or a deposit to a single account, or distribute over multiple accounts. Indispensible if you use charge cards!
- Check address data base stores up to 40 addresses and automatically prints them on checks.
- Fast and easy bank statement reconciliation. Compare!

MAXI CRAS MEANS BUSINESS

MAXI CRAS (short for MAXI Check Register Accounting System) is THE computerized check writing and recording system for small business or personal use. But don't take our word for it! Compare it with any other system available for the TRS-80. Read through our manual, and look at the printed reports that MAXI CRAS produces. Then talk to somebody who uses it. We're sure you'll agree — MAXI CRAS is the most versatile system available!

Don't Know Anything About Computers?

Too many of the computer programs sold today need a computer programmer to understand them. Not MAXI CRAS! Even with all its versatility, MAXI CRAS is so easy to use that we recommend it as an ideal program for new computer owners. And if account books and ledgers scare you off, take heart — our system is so much fun to use that you'll enjoy keeping up to date!

Muzzle A Budget Biter

MAXI CRAS can help you get a muzzle on hidden budget biters. You'll know exactly what you're earning and where it's going, thanks to the remarkable range of reports it can print. A MAXI CRAS exclusive!

The best news of all comes at tax preparation time. MAXI CRAS delivers the information you need in the format required for income tax preparation, uncovering deductible expenditures you might otherwise miss.

MAXI CRAS. An indispensible tool for managing money most effectively.

Use MAXI CRAS with your TRS-80 Model I or III. Requires 48K RAM, two drives, and an 80-column printer.
MAXI CRAS comes with complete operating instructions, sample printouts, and TDOS, a special version of the DOSPLUS operating system.

TRS-80 DISK Model 1&3 012-0153 **$99.95**

TO ORDER, CALL TOLL FREE 800-327-7172 IN FLORIDA (305) 830-8194 ✓20

A Division of Scott Adams, Inc.

THE BUSINESS DIVISION • BOX 3435 • LONGWOOD, FL. 32750 • (305) 830-8194

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

```
10 REM LISTING 9 FOOR NODE
20 PMODE4,1:PCLS:SCREEN1,1
30 PI=3.14159:P1=2*PI:P3=PI/60:P2=PI/2
40 FORT=0TO P1 STEPP3
50 R=COS(2*T)*95
60 X1=COS(T)*R+127:Y1=SIN(T)*R+95
70 A=T+P2
80 R2=COS(2*A)*95
90 X2=COS(A)*R2+127:Y2=SIN(A)*R2+95
100 LINE(X1,Y1)-(X2,Y2),PSET
110 NEXT
120 GOTO120
130 REM MEM = 238
```

Program Listing 9. Four Node

```
10 REM LISTING 10 COLORS
20 FORL=1TO2
30 PMODE1,1:PCLS:SCREEN1,P
40 FORI=0TO250
50 LINE(I,0)-(128,96),PSET
60 NEXT
70 COLOR7,5
80 FORI=0TO191
90 LINE(255,I)-(128,96),PSET
100 NEXT
110 COLOR6,5
120 FORI=255TO0STEP-1
130 LINE(I,191)-(128,96),PSET
140 NEXT
150 COLOR7,5
160 FORI=191TO0STEP-1:LINE(0,I)-(128,96),PSET:NEXT
170 FORJ=1TO1000:NEXTJ
180 P=1:NEXT
190 GOTO190
200 REM MEM = 202
```

Program Listing 10. Colors

```
10 REM LISTING 11 COLORS 2
20 FORL=1TO2
30 PMODE1,1:PCLS:SCREEN1,P
40 LINE(0,0)-(255,191),PSET
50 LINE(255,0)-(0,191),PSET
60 PAINT(125,90),6,0
70 PAINT(125,100),7,0
80 PAINT(20,00),8,0
90 PAINT(160,110),8,8
100 FORI=1TO1500:NEXT
110 P=1
120 NEXTL
130 GOTO130
140 REM MEM = 199
```

Program Listing 11. Colors 2

```
10 REM LISTING 12 COLORS3
20 FORM=1TO10
30 GOSUB210
40 FORL=1TO2:PMODE1,1:PCLS:SCREEN1,P
50 FORI=0TO255STEP127
60 LINE(I,8)-(255-I,191),PSET
70 NEXT
80 J=50:R=1
90 FORK=1TO3
100 FORI=75TO200STEP75
110 Z=A(R)
120 PAINT(I,J),Z,0
130 R=R+1
140 NEXT
150 J=J+50
160 NEXTK
170 FORI=1TO1500:NEXTI
180 IFP=1THENP=0ELSEP=1
190 NEXTM
200 GOTO200
210 FORI=1TO6:A(I)=RND(3)+1:NEXT
220 IFA(1)=A(2)ORA(3)=A(1)ORA(2)=A(4)THEN210
230 IFA(3)=A(5)ORA(4)=A(6)THEN210
240 IFA(5)=A(6)THEN210
250 RETURN
260 REM MEM = 377
```

Program Listing 12. Colors 3

```
10 REM LISTING 13 TAPESTRY
20 PMODE1,1:PCLS:SCREEN1,0
30 K=0
40 FORI= K TO200STEP55
50 COLORRND(3)+5,5
60 LINE(I,0)-(I+55,191),PSET
70 NEXT
80 K=K+10:IFK>200THEN100
90 GOTO40
100 K=255
110 FORI= K TO55STEP-55
120 COLORRND(3)+5,5
130 LINE(I,0)-(I-55,191),PSET
140 NEXT
150 K=K-10:IFK<55THEN170
160 GOTO110
170 FORI=0TO55STEP5
180 COLORRND(3)+5,5
190 LINE(I,0)-(I,191),PSET
200 NEXT
210 FORI=200TO255STEP5
220 COLORRND(3)+5,5
230 LINE(I,0)-(I,191),PSET
240 NEXT
250 GOTO250
260 REM MEM = 358
```

Program Listing 13. Tapestry

```
10 REM LISTING 14 PSET
20 PMODE1,1:PCLS:SCREEN1,1
30 J=0:FORI=0TO255
40 PSET(I,J,7):PSET(255-I,J,7):PSET(I,191-J,7):PSET(255-I,191-J,
7)
50 PSET(I,J+1,7):PSET(255-I,J+1,7):PSET(I,190-J,7):PSET(255-I,19
0-J,7)
60 PSET(I,J+2,7):PSET(255-I,J+2,7):PSET(I,189-J,7):PSET(255-I,18
9-J,7)
70 J=J+4
80 IFJ>189THENJ=0
90 NEXT
100 COLOR7,5

110 LINE(0,96)-(255,96),PSET
120 LINE(0,40)-(255,40),PSET
130 LINE(0,145)-(255,145),PSET
140 GOTO140
150 REM MEM = 342
```

Program Listing 14. PSET

```
10 REM LISTING 15 PSET 2
20 PMODE3,1:PCLS:SCREEN1,0
30 FORI=0TO254
40 J=J+1
50 IFJ>191THENJ=0
60 PSET(I,J,4):PSET(255-I,J,3)
70 PSET(I,191-J,2):PSET(255-I,191-J,4)
80 PSET(I+1,191-J,3):PSET(255-I+1,191-J,2)
90 NEXT
100 GOTO30
110 REM MEM = 100
```

Program Listing 15. PSET 2

```
10 REM LISTING 16 PSET 3
20 PMODE1,1:PCLS:SCREEN1,0
30 Q=RND(3)+1:FORI=0TO255
40 J=J+1
50 IFJ>191THENJ=0
60 PSET(I,J,Q):PSET(255-I,J,3)
70 PSET(I,191-J,2):PSET(255-I,191-J,Q)
80 PSET(I+4,J,2):PSET(I,J+2,4)
90 NEXT
100 GOTO30
110 REM MEM = 177
```

Program Listing 16. PSET 3

I offer Listings 17, 18, 19 and 20 (Star 6, Star 7, Eye and Shrimp) without further comment except to note that Listings 19 and 20 are based on programs which previously appeared in *80 Micro*. I will discuss Circle and Draw in subsequent articles.

Try changing the Mode, Color and Screen in all these programs for different color effects. The Color Computer is a very powerful toy! ■

Franklyn Miller is employed by the U.S.I. Chemical Company. He enjoys programming, electronics and photography.

```
10 REM LISTING 17 STAR 6
20 PMODE1,1:PCLS:SCREEN1,1
30 COLOR7,5
40 LINE(128,0)-(0,191),PSET
50 LINE(129,0)-(255,191),PSET
60 COLOR0,5
70 LINE(0,50)-(255,50),PSET
80 COLOR6,5
90 LINE(0,53)-(253,189),PSET
100 LINE(255,53)-(2,189),PSET
110 GOTO110
120 REM MEM = 184
```

Program Listing 17. Star 6

```
5 REM LISTING 18 STAR 7
10 PMODE1,1:PCLS:SCREEN1,1
20 COLOR0,5
30 LINE(128,0)-(0,191),PSET
40 LINE(129,0)-(255,191),PSET
50 LINE(0,50)-(255,50),PSET
60 LINE(0,53)-(253,189),PSET
70 LINE(255,53)-(2,189),PSET
80 PAINT(120,96),7,8
90 PAINT(50,60),8,0
100 PAINT(200,60),0,0
110 PAINT(128,30),6,0
120 PAINT(50,160),6,8
130 PAINT(220,160),6,0
140 GOTO140
150 REM MEM = 274
```

Program Listing 18. Star 7

```
10 REM LISTING 19 EYE
20 CLS:INPUT"NUMBER OF POINTS";N:DIMA(N),B(N)
30 PI=3.14159:M=2*PI-.001:M1=2*PI/M
40 PMODE3,1:PCLS:SCREEN1,1
50 FORQ=0TO250STEP9
60 X1=0:Y1=Q:X2=Q:Y2=191
70 LINE(X1,Y1)-(X2,Y2),PSET
80 X1=Q:Y1=0:X2=250:Y2=Q
90 LINE(X1,Y1)-(X2,Y2),PSET
100 NEXT
110 LINE(255,0)-(255,191),PSET
120 Z=0
130 FORT=0TO M STEPM1:Z=Z+1
140 A(Z)=COS(T)*75+110:B(Z)=SIN(T)*65+95
150 NEXT:FORS=1TON-1:FORD=S+1TON
160 X1=A(S):Y1=B(S):X2=A(D):Y2=B(D)
170 LINE(X1,Y1)-(X2,Y2),PSET
180 NEXTD,S
190 GOTO190
200 REM MEM = 419
```

Program Listing 19. Eye

```
10 REM LISTING 20 SHRIMP
20 PMODE4,1:PCLS:SCREEN1,0
30 PI=3.14159:P1=2*PI:P2=PI/30:P3=2*PI/3
40 FORT=0TO P1 STEPP2
50 R=T*15
60 X1=COS(T)*R+127:Y1=SIN(T)*R+101
70 A=T+P3
80 X2=COS(A)*R+127:Y2=SIN(A)*R+101
90 LINE(X1,Y1)-(X2,Y2),PSET
100 B=T+2*P3
110 X1=COS(B)*R+127:Y2=SIN(B)*R+101
120 LINE(X1,Y1)-(X2,Y2),PSET
130 X1=COS(T)*R+127:Y2=SIN(T)*R+101
140 LINE(X1,Y1)-(X2,Y2),PSET
150 NEXT
160 GOTO160
170 REM MEM = 343
```

Program Listing 20. Shrimp

ALL HARDWARE **Model I Lowercase**

DUALCASE • ELECTRONIC SHIFT-LOCK • DE-B-BOUNCE
BLOCK CURSOR • SWITCHABLE

"THE PATCH" is compatible with any word processor, any DOS and also other languages which use ROM sub-routines. Assembled and tested $127.00

SCRIPLUS v3.0 (by ROSTEK) is the software "patch" for SCRIPSIT (c) that lets you output control codes to CHANGE TYPE STYLES, UNDERLINE, etc. from within your text files. Written especially for the MX-80 but works fine with most any printer that accepts control codes. Makes your printer do all the tricks it was designed for. +DIR, KILL, MERGE, and MORE, WHILE IN SCRIPSIT (c)
How many times have you wished? Here 'tis! ON DISK 39.95

Need a SUPERFINE lowercase CHARACTER GENERATOR for your MOD I? KSG Technologs builds 'em, and we've got one just for you. Beautiful lowercase, FULL DECENDERS. All of the graphics, of course, INCLUDES the SPECIAL GRAPHICS for CHR$(0) thru CHR$(31) omitted in the later Radio Shack lower case chips. Ask for the CGA-2. You'll love it! Only 29.95

Did you ever bomb a disk? SUPER UTILITY (by Kim Watt) WILL AUTOMATICALLY RECOVER BOOT SECTIONS, GAT TABLES, READ AND COPY PROTECTED MEDIA, TRANSFER FROM ONE DOS TO ANOTHER, SINGLE OR DOUBLE DENSITY and on, and on, and on..... You just wouldn't believe..... Includes a hundred and some odd vital functions. The BEST (no doubt) and very, very highly recommended for ANYONE that uses a TRS-80 MOD I or MOD III with any kind of DISK and any kind of DOS. You just got to use it to realize what you've got here! The name "SUPER UTILITY" is a gross under statement. One use can easily pay for the program. 48K required. Specify 35tk, 40tk or 80 tk media for your Mod I or Mod III. Absolutely professional! You need this! Don't get caught without it. 74.95

The only resource you can't replace is TIME. PLUG IN A SPRINTER (by Holmes Engineering) and
TRIPLE THE SPEED of your TRS-80 MODEL I OR MODEL III.
YES! A NEW Z-80B MICROPROCESSOR IS INCLUDED!
YES! Special circuitry handles your slower memory chips
YES! Automatic switch down to "normal" for disk I/O
YES! IT IS ABSOLUTELY FANTASTIC and only 99.50 COMPLETE!!
Only the cream of the crop..... for you, from HACKS

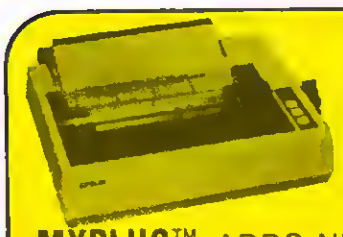
WHEN ORDERING SPECIFY:
"Mem. Size" ☐ "Memory Size" ☐

To order send payment plus $2.00 shipping and handling. Texas residents add 5% sales tax.

HACKS
P.O. BOX 12963
Houston, Texas 77017
713-455-3276

National Distributors
for CECDAT, Inc.

✓ 244



MX-80 OWNERS

MXPLUS™ ADDS NEW CONVENIENCE

- PERF-SKIP TO **AUTOMATICALLY** GIVE YOU TOP AND BOTTOM MARGIN ON EACH PAGE. (SWITCH SELECTABLE, OF COURSE)
- MANUAL PRINT MODE CONTROL TO LET YOU SELECT CONDENSED, EMPHASIZED, OR NORMAL PRINTING **INSTANTLY** USING THE PRINTER PANEL BUTTONS.

MXPLUS™ INSTALLS IN MINUTES, NO SOLDERING!

MXPLUS IS A PLUG-IN MODULE FOR MX-80, MX-80F/T, AND MX-100 AND IS COMPATIBLE WITH GRAFTRAX AND ALL INTERFACE BOARDS. MXPLUS IS UNCONDITIONALLY GUARANTEED FOR 30 DAYS.

MX-80, MX-80 F/T, AND GRAFTRAX ARE TRADEMARKS OF EPSON

ORDER TODAY

ONLY **$49.95**

ORDERS CALL 24 HR. [illegible]
INFORMATION CALL 213-[illegible]

D-ESSELHAUS COMPUTER PRODUCTS
22713 VENTURA BLVD., SUITE F
WOODLAND HILLS, CA 91364

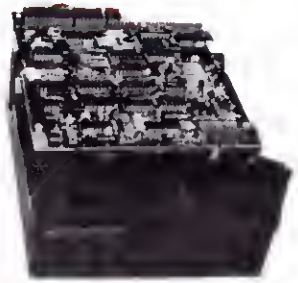
CASH, C.O.D., OR CHARGE WITH MC/VISA

✓ See List of Advertisers on page 338

Tandon Disk Drives

As Low As $199.95

• Single or Double Density Operation •
• 3 - 5 ms Track to Track Access Time •
• 48 Hr. Burn In with Pre / Post Testing •
• Compatible with TRS80®, Zenith, IBM •



TM100-1	Single Sided 40 Track	$199.95
TM100-2	Double Sided 40 Track	$299.95
TM100-3	Single Sided 80 Track	$299.95
TM100-4	Double Sided 80 Track	$399.95

Power Supply & Case $50.00

All Tandon disk drives from Computex are fully tested for Radial Head Alignment, Track 0 Switch, Speed Instantaneous Speed Variation ISV, Azimuth, then verified for data storage integrity, reliability and systems compatibility.

Mini-Winchester 5 MBytes

$995.00

•3 ms Track to Track Access Time•
•5 MByte / Second Data Transfer Rate•
• Storage Capacities up to 14.3 MBytes•
•Seagate ST506 Compatible • 254 T.P.I.•

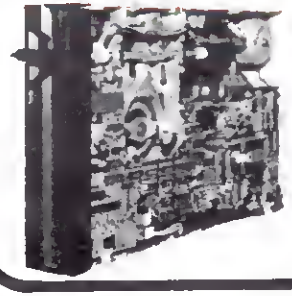
TM602S $995.00
6.38 MBytes Unformatted • 612 Tracks

TM603S $1095.00
9.57 MBytes Unformatted • 918 Tracks

TM603E $1395.00
14.3 MBytes Unformatted • 1380 Tracks

EIGHT-INCH ThinLine™ $395.00

At exactly ½ the width of a standard 8 inch disk drive, you can install two Tandon Thinline drives in the same space and double or quadruple your storage capacities.



FEATURES
• 77 Tracks per Surface •
• Standard Interface • DC Operation Only •
• Single or Double Density • 3 ms Track Access •

TM848-1 $395.00
Single Sided 77 Tracks • 800 KBytes Storage •

TM848-2 $495.00
Double Sided 154 Tracks • 1.6 MBytes Storage •

Power Supply & Case $225.00

Dual Drive Model III

*** Special $1795.00**

FEATURES

P-31 Green Phosphor Display
DOS PLUS 3.3 Operating System
Winchester Expansion Option
Gold Plated Edge Cards
Fully Socketed Drive Controller
Switching Power Supply
Tandon Disk Drives
System Dust Cover
Expansion Capabilities
90 Day Warranty
1 Year Warranty Available

Model 320 $1695.00
One Single Sided 40 Track Drive

* Model 321 ~~$1695.00~~
Two Single Sided 40 Track Drives

Model 322 $2295.00
Two Double Sided 40 Track Drives

Model 324 $2595.00
Two Double Sided 80 Track Drives

Model 325 $3995.00
One TM602 Winchester &
One Single Sided 40 Track Drive

Model 326 $4495.00
One TM603 Winchester Drive
& One Double Sided 80 Trk Drive

We've done it again! All customized Model III systems from Computex now include at *no extra charge DOSPLUS 3.3 and a P-31 Green Phosphor Display.* A Computex customized system starts out as a basic Model III, 32K RAM is added to increase the storage to 48K. Ad to this our Model III drive controller with Winchester expansion option and the appropriate Tandon disk drives per your requirements. The system is then tested vigorously for 48 hours to assure you of peak performance when the system arrives at your doorstep.

See List of Advertisers on page 338

MODEL III INTERNAL WINCHESTER KITS

Now you can upgrade your Model III to *over 30 MBytes* of storage, easily and inexpensively, a step at a time using the Computex Winchester expansion kits. The upgrade to Winchester drives require the Computex floppy disk controller board, Winchester controller board, Host Adaptor, and Winchester switching power supply. Purchase each kit individually, or save even more, and buy the complete Winchester expansion package.

M3WHA-1 WINCHESTER HOST ADAPTOR KIT
$499.95

WINCHESTER DRIVE CONTROLLER BOARD
$595.00

M3WAK-1 WINCHESTER INSTALLATION KIT
$249.95

COMPLETE INTERNAL WINCHESTER KITS

M3WK5 • *5 MByte* • $1995.00
M3WK10 • *10 MByte System* • $2095.00

COMPLETE KITS INCLUDE
• Host Adaptor • Installation Kit •
• Winchester Drive • Winchester Controller •

NEW !!

MODEL III COMMUNICATIONS BOARD

The newest addition to the Computex line of Model III add on kits is our ***M3CB1*** *Communications board complete with* ***RS232*** *and* ***DIRECT CONNECT MODEM.*** *The kit can be supplied in either total kit form or as a partially assembled unit. The partially assembled unit only requires installation of the integrated circuits, all other components have been installed and tested. The* ***M3CB1*** *mounts in the same location as the Radio Shack RS232 board and installs easily in less than one hour.*

FEATURES

• 300 to 1200 Baud RS232 •
•300 Baud Full Duplex Operation•
•Uses FSK Modulation Techniques•
•Supports Originate or Answer Modes•
• Will Operate DTE or DCE Equipment •

M3CB1-1 PCB & MANUAL	*$34.95*
M3CB1-2 ASSEMBLED & TESTED RS232	*$69.95*
M3CB1-3 COMPLETE KIT	*$129.95*
M3CB1-4 PARTIALLY ASSEMBLED KIT	*$169.95*

Our qualified technicians are available for technical questions at (713)488-8022 every day from 4:00 to 5:00 PM

MODEL III DRIVE CONTROLLER KITS

The complete line of Model III drive controllers and expansion kits from Computex represent the best design, reliability and expandability of any drive expansion kits currently on the market.

FEATURES INCLUDE

• *Winchester Host Adaptor Option* • *Gold Plated Edge Card Connectors* • *Silkscreened and Soldermasked P.C.B* • *Completely Socketed for ease in assembly and maintenance* • *Step by step assembly and installation manual written for the first time kit builder* • *Detailed test and troubleshooting instructions* • *Troubleshooting flowcharts and schematics included* • *Theoretical analysis of operation included* •

M3DC1-1B Drive Controller P.C.B and Manuals
You supply components and assembly
$49.95

M3DC1-1K Complete Drive Controller Kit
Includes all necessary components
You Assemble
$109.95

M3DC1-1KA Assembled Drive Controller Kit
Requires installation kit and drives
$139.95

Model III Installation Kit
$149.95
Includes power cables and disk drive data cable, Switching power supply (DON'T USE A LINEAR SUPPLY INSIDE YOUR MODEL III - Heat and Regulation Problems!) and disk drive mounting brackets. Installation kit will work with either the Computex drive controller boards or the Micro Design MDX-3 controller. Be sure and specify which controller you are using!

COMPUTEX

a subsidiary of World Wide Data Systems, Inc.

17321 El Camino Real
Houston, Texas 77058
(713) 488-8022 ↙27

COMPLETE MODEL III DRIVE KITS

Complete Model III Disk Drive Kits include the Computex drive controller *with capabilities of Winchester drive expansion.* Virtually everything you will need to install disk drives in your Model III is included—We even include one of the most popular DOS Systems available, DOS PLUS 3.3.

M3DK0 Drive Kit with 1 Tandon TM100-1
$595.00

M3KD1 Drive Kit with 2 Tandon TM100-1
$799.95

M3DK2 Drive Kit with 2 Tandon TM100-2
$1049.95

M3DK4 Drive Kit with 2 Tandon TM100-4
$1249.95

MDX-3 Interface Expansion Boards for your Model III from Micro-Design

•Floppy Disk Controller • Phone Modem•
•RS232 Port • Silkscreened & Soldermasked PCB•
COMPLETE KIT $259.95

•Printed Circuit Board	$74.95
•Disk Controller Kit	$89.95
•Serial Interface Kit	$79.95
•Phone Modem Kit	$39.95

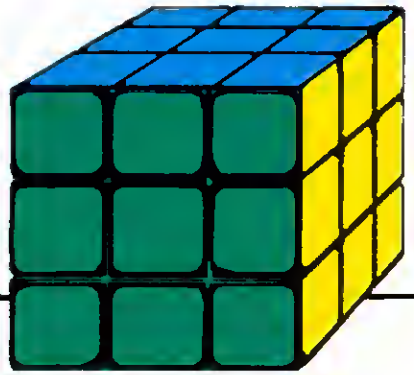
MDX-2 Interface Expansion Boards for your Model I from Micro-Design

NEW LOW PRICE on Complete Kit *$249.95*

•MDX-2 printed circuit board	$74.95
•Onboard direct connect modem kit	$39.95
•2K/4K Eprom kit	$11.95
•RS232 mA serial interface	$24.95
•Heal-time clock kit	$17.95
•32K RAM expansion kit (less RAM)	$17.95
•Floppy disk controller kit	$31.95
•Cassette port	$4.95
•Analog power supply	$29.95
•Hardware and socket kit	$29.95
•Centronic line printer port	$11.95

VISA, MASTERCARD and AMERICAN EXPRESS
NET 30 TERMS AVAILABLE
D&B Rated Firms, Universities, and Government
Net 30 Terms Require a 10% Handling Fee
• Prices quoted are available mail order only •
• Prices do not include shipping •
• Prices are subject to change without notice •

LOAD 80



Let your tube unscramble your cube.

Cube-80

Winefred Washington Jr.
P.O. Box 732
Louisville, KY 40201

". . . take a break while the computer works on your cube."

You can be free of Rubik's Cube frustration with this program, Cube-80, and a TRS-80.

Cube-80 is a Basic program that solves Rubik's Cube by determining which squares are out of place and then selecting a set of moves to return the squares to their original positions.

How to Use Cube-80

When Cube-80 is run, it asks for the color orientation of your cube. Not all cubes have the same colors or color orientations. The color orientation describes the geometric relationship of the colored sides on a particular cube. Each side's center square establishes the color for that side. A cube might be completely scrambled, but the six center squares never change positions with respect to each other.

Once you have picked a side to be the top, use Fig. 1 to determine the orientation of the remaining sides. Cube-80 solves the top first. If your cube has one side completed, use that side as the top. Answer the prompts for each side with the color of the center square.

Once the color orientation for the cube is entered, the computer internally assigns constants. This process takes a few seconds. The next prompts ask for one of the three options available from Cube-80. The three options are input, move and solve.

Input

Here you are able to tell the computer the present position of your scrambled cube. In the input mode the computer asks you to enter Stop or a color for a specific square. Each square is numbered (Fig. 2). Carefully enter the first letter of the color for the specific square. If you make a mistake type Stop and the computer will return you to the option mode.

Once all 54 squares are entered, the computer checks for the correct number and location of colors. If white and orange are on opposite sides of a cube, the scrambled cube can never show white next to orange. The computer will detect this mistake. If you do have a mistake, the computer will tell you and go back to the option mode.

Move

To scramble a cube on your computer, type Move while in option mode. The computer will ask you for Stop or a move. All moves are numbered (Fig. 3). After scrambling the cube, type

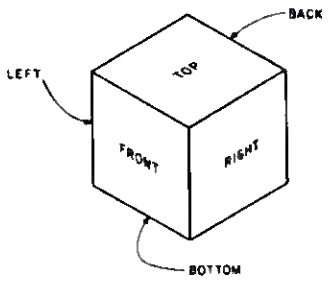


Fig. 1. The six sides of the cube and their names

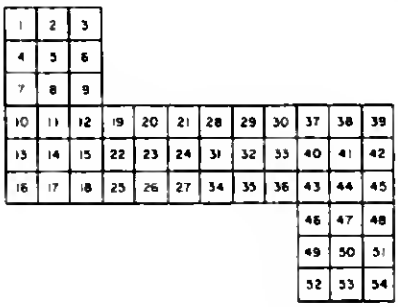


Fig. 2. Unfolded cube with each square numbered

The Key Box

Model I or III
16K RAM
Cassette or Disk Basic

Convert your TRS-80* into a World Class Computer

that REDUCES EYE FATIGUE AND DOESN'T FLICKER

...with LSI's new *Soft-View* Replacement CRT...

The black & white "TV Screen" CRT (picture tube) which came with your TRS-80* model II or III is an inexpensive rapid "P4" Phosphor CRT intended for TV use. The display is actually strobing 60 times a second. No amount of "green plastic" will stop this strobing or eliminate the eye fatigue it causes. But a new *Soft-View* CRT display tube with a slower decaying, colored Phosphor will:

- Available in slow-decay green (similar to new IBM* and APPLE III* monitors) or medium decay "European Orange" (easy on the eyes, elegantly beautiful, and the standard for CRT displays in Europe)
- Leaded glass stops X-ray emission
- Optional Anti Glare Frosted Glass available to reduce eye strain from glare
- Easy installation — tube comes with pre-mounted hardware
- 30-Day Money Back Guarantee
- Ideal for Word-Processing & Programming, fast enough for Games & Graphics
- Finest quality double-dark glass and phosphor fields make the letters seem to be coming out of black space

Try This Test:

Turn the brightness control on your TRS-80* all the way up. Wave your hand up and down in front of the screen. See how jerky it seems? Just like in front of a strobe light! That's because the screen actually is strobing at you. A slower phosphor CRT will reduce that troublesome strobe effect. That's why most of the newer monitors, from IBM* to Apple III* are using the new slow-phosphor CRT's.

LSI's new *Soft-View* CRT

LSI SYSTEMS *Soft-View* CRT's:

- ☐ #GN42 Green Phosphor $79.95
- ☐ #GN42G Green Phosphor with anti-glare $89.95
- ☐ #OR34 Orange Phosphor $89.95
- ☐ #OR34G Orange Phosphor with anti-glare $99.95

ADD $3 FOR PACKAGING AND UPS SHIPPING

Langley-St.Clair Instrumentation Systems, Inc.

v462

To Order Call:
1-800-221-7070
Dealer Inquiries Invited

132 West 24th Street, New York, N.Y. 10011 212-989-6876

"IBM", APPLE and TRS-80* are trademarks of IBM, APPLE Computer & TANDY Corp.

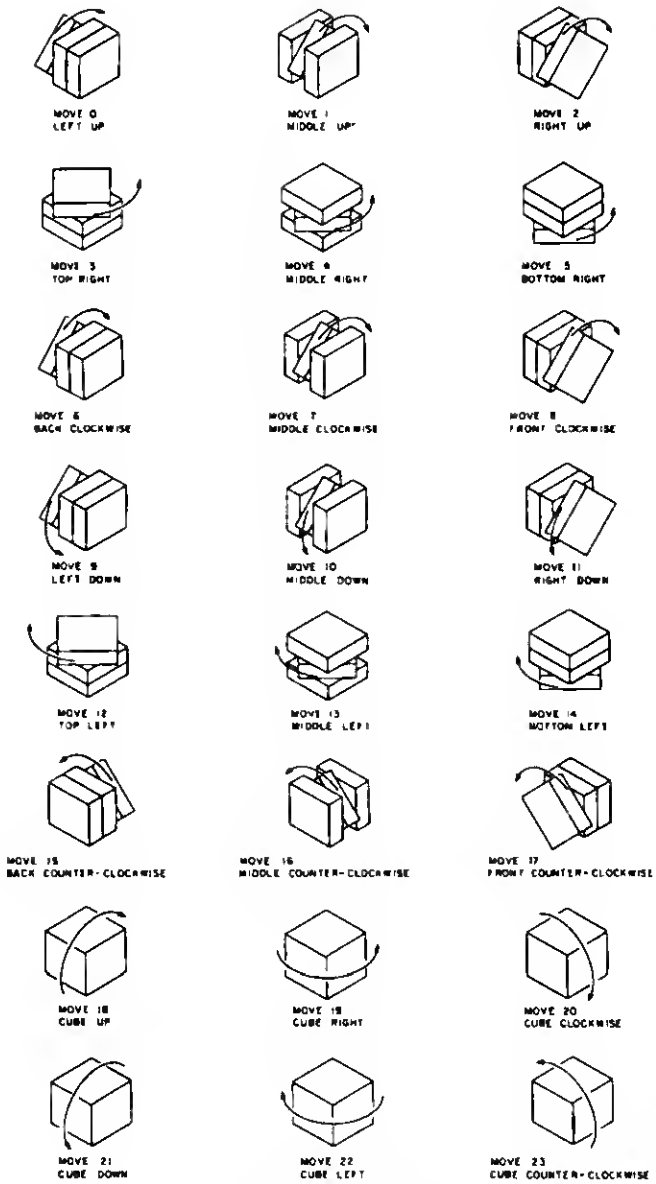


Fig. 3. Numbered move options

Stop to return to the option mode.

Solve

This option will, of course, solve a scrambled cube. Once Solve is entered the computer asks for a time delay, which I will explain leter.

When the computer finds a set of moves for a specific arrangement, it will stop and wait for you to hit a key. During this waiting period, the computer flip-flops the cassette output bit. If you have a small audio amplifier, connect it to the large gray plug. The noise you will hear is e signal meaning the computer has found a set of moves. You can take a break while the computer works on your cube.

Implementing the Fix

A solution can be just one move or up to 20 moves. The computer can display the moves very quickly, but will ask you to enter a time delay between moves to give you time to turn the cube. The delay ranges from zero to almost five seconds depending on what number you enter. Begin with a seven, but you may eventually become fast enough to use a one or a zero.

When the computer finds a set of moves, position the cube *exactly* es shown on the screen. The front of the cube is always facing you, even though the color of the front may not be

". . . the six center squares never change positions . . ."

what you first entered during the color orientetion of the cube. Use Fig. 3 to help you match the displayed words with the actual move. Be careful with the middle moves because the cube has three middles. One middle can be rotated up or down; another can be rotated right or left; and the last can be rotated clockwise or counter-clockwise.

The computer can solve Rubik's Cube in 15-30 minutes. If you make a mistake during any part of the solution, you will have to start all over and input the cube from the point where you made the mistake. As the computer comes closer to completing the cube, the time necessary to locate a set of moves may increase. If the computer seems to repeat the same set of moves, have faith and keep going.

The program may be slow compared to Assembly language game programs, but it is faster than not working the cube at all. ■

Winefred Washington is an engineering co-op student at University of Tennessee.

Program Listing

```
10 REM                    ************************
20 REM                    **       CUBE-80      **
30 REM                    ** BY W. WASHINGTON   **
40 REM                    **       2/1/82       **
50 REM                    ************************
100 CLEAR 1500:DIM C(55),CC(55),B(28),BB(28),A$(26),S(55),M$(26)

110 CLS:PRINT@13,"** THE COLOR ORIENTATIOR OF CUBE **":PRINT:PRI
NT"ENTER TRE CENTER SQUARE'S COLOR ON THE ..."
120 PRINT:INPUT"TOP";X$(1):INPUT"FRONT";X$(2):INPUT"RIGHT";X$(3)
:INPUT"BACK";X$(6):INPUT"LEFT";X$(5):INPUT"BOTTOM";X$(6):PRINT"C
OMPUTING...":FORX=1TO6:S(X)=ASC(LEFT$(X$(X),1)):NEXT:GOSUB160  :
GOSUB170  :GOSUB360
130 PRINT@576,STRING$(60,32);PRINT@576,"ENTER AN OPTION (INPUT,
MOVE, SOLVE)";:INPUTX$:PRINT@576,STRING$(45,32):IF LEFT$(X$,3)="
INP" THEN GOSUB360  :GOTO130
140 IF LEFT$(X$,3)="SOL" THEN INPUT"ENTER DELAY BETWEEN MOVES FR
OM 0 TO 10";DD:GOSUB470  :GOTO130
150 IF LEFT$(X$,3)="MOV" THEN GOSUB340  :GOSUB350  :GOTO130  ELS
E GOTO130
160 FOR X=1 TO 9:C(X)=1:C(X+9)=2:C(X+18)=4:C(X+27)=8:C(X+36)=16:
C(X+45)=32:NEXT:GOSUB620  :GOSUB440  :RETURN
170 FOR Y=0 TO 6
180 READ X:IF X<>0 THEN A$(Y)=A$(Y)+CHR$(X+137):A$(Y+9)=CHR$(X+1
37)+A$(Y+9):GOTO180  ELSE NEXT
190 A$(18)=A$(0)+A$(1)+A$(2):A$(19)=A$(3)+A$(4)+A$(5):A$(20)=A$(
6)+A$(7)+A$(8):A$(21)=A$(9)+A$(10)+A$(11):A$(22)=A$(12)+A$(13)+A
$(14):A$(23)=A$(15)+A$(16)+A$(17)
200 FOR Y=0 TO 23:READ M$(Y):NEXT:RETURN
210 FOR X=1 TO LEN(A$(Y))-1 STEP2:CC(ASC(MID$(A$(Y),X+1,1))-137)
=C(ASC(MID$(A$(Y),X,1))-137):NEXT
220 FOR X=2 TO LEN(A$(Y)) STEP2:C(ASC(MID$(A$(Y),X,1))-137)=CC(A
SC(MID$(A$(Y),X,1))-137):NEXT:GOSUB 620  :GOSUB 440  :RETURN
230 DATA 1,36,4,33,7,30,10,1,13,4,16,7,40,10,47,13,46,16,36,48,3
3,47,30,46,37,43,38,40,39,37,42,38,45,39,44,42,43,45,40,44,0
240 DATA 2,35,5,32,8,29,11,2,14,5,17,8,51,11,50,14,49,17,35,51,3
2,50,29,49,0
250 DATA 3,34,6,31,9,28,12,3,15,6,18,9,54,12,53,15,52,18,34,54,3
1,53,28,52,21,27,28,24,19,21,22,28,25,19,26,22,27,25,26,28,0
260 DATA 10,19,11,20,12,21,19,28,20,29,21,30,28,37,29,38,30,39,3
7,10,38,11,39,12,7,9,0,6,9,3,6,2,3,1,2,6,1,7,4,8,0
270 DATA 13,22,14,23,15,24,22,31,23,32,24,33,31,40,32,41,33,42,4
0,13,41,14,42,15,0
280 DATA 16,25,17,26,18,27,25,34,26,35,27,36,34,43,35,44,36,45,4
3,16,44,17,45,18,48,54,51,53,54,52,53,49,52,46,49,47,46,48,47,51
,0
290 DATA 1,21,2,24,3,27,21,52,24,49,27,46,52,43,49,40,46,37,43,1
,40,2,37,3,30,28,29,31,28,36,31,35,36,30,35,33,36,30,33,29,0
300 DATA 6,20,5,23,6,26,20,53,23,50,26,47,53,44,50,41,47,38,44,4
,41,5,38,6,0
310 DATA 7,19,8,22,9,25,10,12,11,15,12,18,15,17,18,16,17,13,16,1
0,13,11,19,56,22,51,25,48,54,45,51,42,48,39,45,7,42,0,39,9,0
320 DATA "LEFT UP","MIDDLE UP","RIGHT UP","TOP RIGHT","MIDDLE RI
GHT","BOTTOM RIGHT","BACK CLOCKWISE","MIDDLE CLOCKWISE","FRONT C
LOCKWISE","LEFT DOWN","MIDDLE DOWN","RIGHT DOWN","TOP LEFT","MID
DLE LEFT","BOTTOM LEFT","BACK COUNTER-CLOCKWISE"
330 DATA "MIDDLE COUNTER-CLOCKWISE","FRONT COUNTER-CLOCKWISE","C
UBE UP","CUBE RIGHT","CUBE CLOCKWISE","CUBE DOWN","CUBE LEFT","C
UBE COUNTER-CLOCKWISE"
340 CLS:PRINT@25,"** CUBE-80 **";YY=Y:FOR X=0 TO 65 STEP 9:FOR X
=0 TO 6 STEP 3:FOR Y=1 TO 3:POKE 15699+4*Y/9+64*X/3+Y,X(LOG(C(X+
Y+8))/LOG(2)+1):NEXTY,X,X:PRINT@532,"TOP ";"FRT ";"RHT ";"BCK ";
"LFT ";"BTM";Y=YY:RETURN
350 PRINT@576,"ENTER A MOVE FROM 0 TO 23 OR 'STOP'";:INPUTY$:IF
Y$="STOP" THEN RETURN ELSE Y=VAL(Y$):GOSUB210  :GOSUB340  :GOTO3
50
360 PRINT@576,STRING$(50,32):FOR X=0 TO 45 STEP 9:FOR X=0 TO 6 S
```

Program continues

Scanned by Ira Goldklang - www.trs-80.com

Your Software couldn't be in Better Hands than in Big Five's

We are looking for arcade type games and any other unique or original game ideas for the TRS-80, Apple, and Atari home computers

If you have written any game programs that you would like to submit for review, call or write us for a free submission pack.

Call or write now and join us at . . .

BIG FIVE SOFTWARE

P.O. Box 9078—165 • Dept. EM • Van Nuys, CA 91409 • (213) 782-0951

Apple is a registered trademark of Apple Computer Corp
Atari is a registered trademark of Atari, Inc

© 1982 Big Five Software
TRS-80 is a registered trademark of the Tandy Corporation

Program continued

```
TEP 3:FOR Y=1TO3:PRINT@576,"ENTER 'STOP' OR FIRST LETTER OF COLO
R FOR SQUARE";X+Y+Z;:INPUT$:IFLEFT$(C$,2)="ST"ORLEN(C$)>1THENRE
TURNELSEFORW=1 TO 6:IF CS=K$(W) THEN C(X+Y+Z)=2[(W-1) ELSE NEKTH

378 POKE 15699+4*Z/9+64*K/3+Y,K{LOG(C(X+Y+Z))/LOG(2)+1):NEXTY,X,
Z:PRINT@532,"TOP ";"FRT ";"RHT ";"BCK ";"LFT ";"BTH"
388 INPUT"IS CUBE CORRECT";Z$:IF LEFT$(Z$,1)="Y" THEN GOTO390
ELSE IF LEFT${Z$,1)<>"N" THEN 388   ELSE 360
398 FORH=0 TO 5:H(H)=0:NEXT:FOR X=1 TO 54:H(LOG(C(X))/LOG(2))=H(
LOG(C(X))/LOG(2))+1:NEXT:FORB=0 TO 5:IF H(H)<>9 THEN 410   ELSE
NEXTH
400 GOSUB440  :FOR X=1 TO 27:FOR Y=1 TO 27:IF B(Y)<>BB(X) THEN N
EKTY:GOTO410   ELSE NEXTY:RETURN
410 CLS:PRINT"MISTAKE IN COGOR ARRANGENENT";RETURN
420 B(10)=C(32)+C(41):B(11)=C(32):B(12)=C(23)+C(32):B(13)=C(41):
B(14)=0:B(15)=C(23):B(16)=C(14)+C(41):B(17)=C(14):B(18)=C(14)+C(
23):B(1)=C(5)+B(10):B(2)=C(5)+B(11):B(3)=C(5)+B(12):B(4)=C(5)+B(
13):B(5)=C(5):B(6)=C(5)+B(15):B(7)=C(5)+B(16):B(8)=C(5)+B(17)
430 B(9)=C(5)+B(10):B(19)=C(50)+B(10):B(20)=C(50)+B(11):B(21)=C(
50]+B(12):B(22)=C(50)+B(13):B(23)=C(50):B(24)=C(50)+B(15):B(25)=
C(50)+B(16):B(26)=C(50)+B(17):B(27)=C(50)+B(18):RETURN
440 BB(1)=C(1)+C(30)+C(37):BB(2)+C(2)+C(29):BB(3)+C(3)+C(21)+C(2
8):BB(4)+C(4)+C(38):BB(5)=C(5):BB(6)=C(6)+C(20]:BB(7)=C(7)+C(18)
+C(39):BB(8)=C(8)+C(11):BB(9)+C(9)+C(12)+C(19):BB(10)=C(33)+C(40
):BB(11)=C(32):BB(12)=C(24)+C(31):BB(13)=C(41)
450 BB(14)=0:BB(15)=C(23):BB(16)=C(13)+C(42):BB(17)=C(14):BB(18)
+C(15)+C(22):BB(19)=C(36)+C(43)+C(46):BB(20)=C(35)+C(49):BB(21)=
C(27)+C(34)+C(52):BB(22)=C(44)+C(47):BB(23)=C(50):BB(24)=C(26)+C
(53):BB(25)=C(16)+C(45)+C(48)
460 BB(26)=C(17)+C(51):BB(27)=C(18)+C(25)+C(54):RETURN
470 U=C(5):IF C(1)+C(2)+C(3)+C(4)+C(5)+C(6)+C(7)+C(8)+C(9)=9*C(5
)ANDB(1)=BB(1)ANDB(2)=BB(2)ANDB(3)=BB(3)ANDB(4)=BB(4)ANDB(6)=BB(
6)ANDB(7)=BB(7)THEN 870
480 IF C(1)+C(3)+C(5)+C(7)+C(9)=5*C(5)ANDB(1)=BB(1)ANDB(3)=BB(3)
ANDB(7)=BB(7)THEN 670
490 K$="":IF B(9)<>BB(9)ORC(5)<>C(9)THEN500   ELSE Y=22:GOSUB210
  :GOTO490
500 IF B(9)=BB(19) THEN K$="0505":GOTO580
510 IF B(9)=BB(9) THEN 580
520 IF B(9)=BB(21) THEN K$="14":GOTO580
530 IF B(9)=BB(27) THEN 580
540 IF B(9)=BB(25) THEN K$="05":GOTO580
550 IF B(9)=BB(1) THEN K$="150506":GOTO 580
560 IF B(9)=BB(3) THEN K$="920511":GOTO 580
570 IF B(9)=BB(7) THEN K$="090500"
580 GOSUB 590  :GOTO 480
590 IF K$="" THEN 600   ELSE GOSUB 2100
600 IF B(9)=BB(9)ANDC(5)=C(12)THEN K$="110502141108502":GOTO 660

610 IF B(9)=BB(9)ANDC(5)+C(19)THEN K$="0814179508141?":GOTO 660

620 IF B(9)=BB(27)ANDC(5)=C(18)THEN K$="0005?7":GOTO 660
630 IF B(9)=BB(27)ANDC(5)=C(54)THEN K$="11050208050?7":GOTO 660

640 IF B(9)=BB(27)ANDC(5)=C(25)THEN K$="111402":GOTO 660
650 Y=22:GOSUB2100  :RETURN
660 GOSUB 2100 :RETURN
670 IF B(2)=BB(2)ANDB(4)=BB(4)ANDB(8)=BB(8)ANDB(6)=BB(6)ANDC(2)=
C(5)ANDC(4)=C(5)ANDC(6)=C(5)ANDC(8)=C(5) THEN 470
680 IF B(8)=BB(8)ANDC(5)=C(8) THEN K$="22":GOSUB2100 :GOTO680
690 IF B(8)=BB(22) THEN K$="05":GOTO 760
700 IF B(8)=BB(20) THEN K$="0505":GOTO 760
710 IF B(8)=BB(24) THEN K$="14":GOTO 760
720 IF B(8)=BB(4) THEN K$="191005011422050:GOTO 760
730 IF B(8)=BB(2) THEN K$="22221005811422220505":GOTO 760
740 IF B(8)=BB(6) THEN K$="2210050114191?":GOTO 760
750 GOSUB 770  :GOTO 670
760 GOSUB 2100 :GOSUB 770  :GOTO 670
770 IF B(8)=BB(8)ANDC(5)=C(11)THEN K$="1005050100041713":GOTO860

780 IF B(8)=BB(12) TNEN K$="171313008404":GOTO 860
790 IF B(8)=BB(10) THEN K$="0004041713?3":GOTO 860
800 IF B(8)=BB(16)ANDC(5)=C(42) THEN K$="13170400": GOTO 860
810 IF B(8)=BB(18)ANDC(5)=C(22) THEN K$="04001317":GOTO 860
820 IF B(8)=BB(16)ANDC(5)=C(13) THEN K$="1300040417?3":GOTO 860

830 IF B(8)=BB(18)ANDC(5)=C(15] THEN K$="041713130004":GOTO 860

840 IF B(8)=BB(26)ANDC(5)=C(51) THEN K$="1005050?":GOTO 860
850 IF B(8)=BB(26)ANDC(5)=C(17) THEN K$="00041703":GOTO 860
860 GOSUB 2100 :RETURN
870 IF C(46)+C(47)+C(48)+C(49)+C(50)+C(51)+C(52)+C(53)+C(54)=9*C
(50]ANDB(19)=BB(19)ANDB(20)=BB(20)ANDB(21)=BB(21)ANDB(22)=BB(22]
ANDB(23)=BB(23)ANDB(24)=BB(24)ANDB(25)=BB(25) THEN 1170
880 IF C(46)+C(48)+C(50)+C(52)+C(54)=5*C(50]ANDB(19)=BB(19)ANDB(
21)=BB(21)ANDB(25)=BB(25] THEN 1170
890 IF C(50]=C(46)AND(C(50]=C(52)ORC(50)=C(48)]THEN 960
900 IF C(50]=C(54)AND(C(50]=C(48)ORC(50)=C(52)) THEN 960
910 IF C(50)=C(46) THEN K$="22":GOTO950
920 IF C(50)=C(48) THEN K$="2222":GOTO950
930 IF C(50)=C(54) THEN K$="19":GOTO950
940 K$="11050205081417":GOSUB 2100 :GOTO 890
950 GOSUB 2100 :K$="11050205081417":GOSUB2100 :GOTO 890
960 IF B(21)=BB(21)ANDB(19)=BB(19)ANDB(25)=BB(25)ANDB(27)=BB(27)
 THEN K$="18":GOSUB2100 :GOTO1100
970 IF B(21)=BB(21)ANDB(19)=BB(19)THEN K$="182323":GOSUB2100 ::G
OTO 1050
980 IF B(21)=BB(21)ANDB(27)=BB(27] THEN K$="1823":GOSUB2100 :GOT
O1050
990 IF B(21)=BB(21) THEN 1010
1000 K$="14";GOSUB 2100 :GOTO 960
1010 K$="1818":GOSUB2100
1020 K$="120203091211030?":GOSUB2100
1030 IF B(1)=BB(1)ANDB(3)=BB(3)ANDB(7)=BB(7) THEN K$="21":GOSUB2
100 :GOTO1100
1040 IF B(3)=BB(3)ORB(7)=BB(7) THEN K$="21":GOSUB2100 :GOTO1050
 ELSE GOTO1020
1050 IF B(7)=BB(7)ANDB(9)=BB(9) THEN 1090
1060 IF B(25)=BB(25)ANDB(7)=BB(7) THEN K$="20":GOSUB2100 :GOTO10
90
1070 IF B(9)=BB(9)ANDB(27)=BB(27) THEN K$="23":GOSUB 2100 :GOTO
1090
1080 IF B(25)=BB(25)ANDB(27)=BB(27) THEN K$="2323":GOSUB2100 :GO
TO1090

1090 S$="1217031717111717021712170317171111717021717051717141705
714":GOSUB 2100 :GOTO 1100
1100 FOR E=10 TO 18:IF C(H)+C(14) THEN NEXT:GOTO1170  ELSE GOTO1
120
1110 IF C(10)+C(12)+C(14)+C(16)+C(18)-5*C(14)ANDB(7)=BB(7)ANDB(9
)=BB(9)ANDB(25)=BB(25) THEN 1170
1120 IF C(14)=C(10]ANDC(14)=C(12)ANDB(7)=BB(7)ANDB(9)=BB(9) THEN
 K$="2323":GOSUB2100 :GOTO1160
1130 IF C(14)=C(16)ANDC(14)=C(18)ANDB(25)=BB(25)ANDB(7)=BB(7) TH
EN K$="23":GOSUB2100 :GOTO1160
1140 IF C(14)=C(12)ANDC(14)=C(18)ANDB(9)=BB(9)ANDB(27)=BB(27) TH
EN K$="20":GOSUB2100 :GOTO1160
1150 IF C(14)=C(12)ANDB(9)=BB(9) THEN K$="20":GOSUB2100 :GOTO111
9
1160 K$="021515110315151208003151512021515117":GOSUB2100 :GOTO11
10
1170 FOR T=1 TO 4:IF B(2)=BB(2)ANDB(4)=BB(4)ANDB(6)=BB(6)ANDB(8)
=BB(8]ANDB(10)=BB(10)ANDB(12)=BB(12)ANDB(16)=BB(16)ANDB(18)=BB(1
8)ANDB(28)=BB(20)ANDB(22)=BB(22)ANDB(24)=BB(24) THEN 1180  ELSE
1190
1180 FOR V=0 TO 5:FOR W=1+9*V TO 9+9*V:IF C(W)=C(9*V+5) THEN NEX
T W,V:CLS:PRINT"THE CUBB IS COMPLETED":RETURN
1190 IF C(32)=U THEN K$="19":GOSUB2100  ELSE IF C(14)=U THEN K$=
"22":GOSUB2100  ELSE IP C(23)=U THEN K$="1919":GOSUB2100  ELSE I
F C(5)=U THEN K$="23":GOSUB2100  ELSE IF C(50]=U THEN K$="20":GO
SUB2100
1200 ON T GOSUB1220 ,1420 ,1560 ,1640
1210 NEXTT:GOTO1170
1220 FORL=1 TO 3
1230 IF (B(8)=BB(26)ORB(26)=BB(8)ORB(2)=BB(20)ORB(20]=BB(2)]AND(
B(8)<>BB(8]ANDB(26)<>BB(26]ANDB(20]<>BB(20]ANDB(2)<>BB(2)) THEN
GOSUB1800 :RETURN
1240 IF (B(8)=BB(26]ORB(26]=BB(8)ORB(24)=BB(6]ORB(6)=BB(24))AND(
B(8)<>BB(8]ANDB(26)<>BB(26]ANDB(24)<>BB(24]ANDB(6)<>BB(6)) THEN
GOSUB1810 :RETURN
1250 IF (B(8)=BB(2)ORB(2)=BB(26)ORB(26)=BB(8)]AND(B(8)<>BB(8)AND
B(2)<>BB(2)ANDB(26)<>BB(26)) THEN GOSUB1820 :RETURN
1260 IF (B(2)=BB(8)ORB(26)=BB(2)ORB(8)=BB(26))AND(B(2)<>BB(2)AND
B(26)<>BB(26)ANDB(8)<>BB(8)) THEN GOSUB1830 :RETURN
1270 IF (B(2)=BB(24)ORB(24)=BB(8)ORB(8)=BB(2))AND(B(2)<>BB(2)AND
B(24)<>BB(24)ANDB(8)<>BB(8)) THEN GOSUB1840 :RETURN
1280 IF (B(24)=BB(2)ORB(8)=BB(24)ORB(2)=BB(8))AND(B(24)<>BB(24]A
NDB(8)<>BB(8)ANDB(2)<>BB(2)) THEN GOSUB1850 :RETURN
1290 IF (B(8)=BB(2)ORB(2)=BB(12)ORB(12)=BB(8))AND(B(8)<>BB(8)AND
B(2)<>BB(2)ANDB(12)<>BB(12)) THEN GOSUB1860 :RETURN
1300 IF (B(2)=BB(8)ORB(12)=BB(2)ORB(8)=BB(12)]AND(B(2)<>BB(2)AND
B(12]<>BB(12)ANDB(8)<>BB(8)) THEN GOSUB1870 :RETURN
1310 IF (B(2)=BB(8)ORB(18)=BB(2)ORB(8)=BB(18))AND(B(2)<>BB(2)AND
B(18)<>BB(18)ANDB(8)<>BB(8)) THEN GOSUB1880 :RETURN
1320 IF (B(8)=BB(2)ORB(2)=BB(18)ORB(18)=BB(8))AND(B(8)<>BB(8)AND
B(2)<>BB(2)ANDB(18)<>BB(18)) THEN GOSUB1890 :RETURN
1330 IF (B(2)=BB(26)ORB(26)=BB(18)ORB(18)=BB(2))AND(B(2)<>BB(2)A
NDB(26)<>BB(26)ANDB(18)<>BB(18)) THEN GOSUB1920 :RETURN
1340 IF (B(26)=BB(2)ORB(18)=BB(26)ORB(2)=BB(18))AND(B(26]<>BB(26
)ANDB(2)<>BB(2)ANDB(18)<>BB(18)) THEN GOSUB1930 :RETURN
1350 IF (B(2)=BB(6)ORB(6)=BB(8)ORB(8)=BB(2))AND(B(2)<>BB(2)ANDB(
6)<>BB(6)ANDB(8)<>BB(8)) THEN GOSUB2030 :RETURN
1360 IF (B(6)=BB(2)ORB(8)=BB(6)ORB(2)=BB(8))AND(B(6)<>BB(6)ANDB(
2)<>BB(2)ANDB(8)<>BB(8)) THEN GOSUB2020 :RETURN
1370 IF B(6)=BB(6)ANDB(8)=BB(8)ANDC(5)<>C(8)ANDC(5)<>C(6) THEN G
OSUB2040 :RETURN
1380 IF B(2)=BB(2)ANDB(8)=BB(8]ANDC(5)<>C(2)ANDC(5)<>C(8] THEN G
OSUB2050 :RETURN
1390 IF B(8)=BB(8)ANDB(24)=BB(24)ANDC(5]<>C(8)ANDC(23)<>C(26) TH
EN GOSUB2060 :RETURN
1400 IF B(26)=BB(26)ANDB(6)=BB(6]ANDC(14)<>C(17)ANDC(5)<>C(6) TH
EN GOSUB2070 :RETURN
1410 K$="18":GOSUB2100 :NEXT:RETURN
1420 K$="22":GOSUB2100 :FOR L=1 TO 3
1430 IF (B(8)=BB(26)ORB(26)=BB(8)ORB(6)=BB(24)ORB(24)=BB(6))AND(
B(8)<>BB(8]ANDB(26)<>BB(26]ANDB(6)<>BB(6]ANDB(24)<>BB(24)) THEN
GOSUB1810 :RETURN
1440 IF (B(4)=BB(18)ORB(18)=BB(8)ORB(8)=BB(4))AND(B(4)<>BB(4)AND
B(18)<>BB(18]ANDB(8)<>BB(8)) THEN GOSUB1960 :RETURN
1450 IF (B(18)=BB(4)ORB(8)=BB(18)ORB(4)=BB(8))AND(B(18]<>BB(18)A
NDB(4)<>BB(4)ANDB(8)<>BB(8)) THEN GOSUB1970 :RETURN
1460 IF (B(4)=BB(26)ORB(26)=BB(18)ORB(18)=BB(4))AND(B(4)<>BB(4)A
NDB(26)<>BB(26)ANDB(18)<>BB(18)) THEN GOSUB1980 :RETURN
1470 IF (B(26)=BB(4)ORB(18)=BB(26)ORB(4)=BB(18)]AND(B(26)<>BB(26
)ANDB(4)<>BB(4)ANDB(18)<>BB(18)) THEN GOSUB1990 :RETURN
1480 IF (B(4)=BB(16)ORB(16)=BB(8)ORB(8)=BB(4))AND(B(4)<>BB(4)AND
B(16)<>BB(16)ANDB(8)<>BB(8)) THEN GOSUB2000 :RETURN
1490 IF (B(16)=BB(4)ORB(8)=BB(16)ORB(4)=BB(8))AND(B(16)<>BB(16)A
NDB(4)<>BB(4)ANDB(8)<>BB(8)) THEN GOSUB2010 :RETURN
1500 IF B(6)=BB(6)ANDB(8)=BB(8]ANDC(5)<>C(8)ANDC(5)<>C(6) THEN G
OSUB2040 :RETURN
1510 IF B(4)=BB(4)ANDB(6)=BB(6)ANDB(22]=BB(22)ANDB(18)=BB(18)AND
C(5)<>C(4]ANDC(5]<>C(6)ANDC(41)<>C(44)ANDC(14)<>C(15) THEN GOSUB
2080 :RETURN
1520 IF B(6)=BB(6)ANDB(22)=BB(22]ANDC(5)<>C(6)ANDC(41)<>C(44) TH
EN GOSUB2090 :RETURN
1530 IF B(8)=BB(8)ANDB(24)=BB(24)ANDC(5)<>C(8]ANDC(23)<>C(26) TH
EN GOSUB2060 :RETURN
1540 IF B(6)=BB(6)ANDB(26)=BB(26)ANDC(5)<>C(6)ANDC(14)<>C(17) TH
EN GOSUB2070 :RETURN
1550 K$="26":GOSUB2100 :NEXT:RETURN
1560 K$="2222":GOSUB2100 :FOR L=1 TO 3
1570 IF (B(2)=BB(26)ORB(26)=BB(16)ORB(16)=BB(2))AND(B(2)<>BB(2)A
NDB(26)<>BB(26)ANDB(16)<>BB(16)] THEN GOSUB1980 :RETURN
1580 IF (B(26)=BB(2)ORB(16)=BB(26]ORB(2)=BB(16))AND(B(26]<>BB(26
)ANDB(2)<>BB(2)ANDB(16)<>BB(16)) THEN GOSUB1910 :RETURN
1590 IF (B(4)=BB(18)ORB(18)=BB(8)ORB(8)=BB(4))AND(B(8)<>BB(8)AND
B(18)<>BB(18)ANDB(4)<>BB(4)) THEN GOSUB1940 :RETURN
1600 IF (B(18)=BB(4)ORB(8)=BB(18)ORB(4)=BB(8))AND(B(18]<>BB(18)A
NDB(8)<>BB(8)ANDB(4)<>BB(4)) THEN GOSUB1950 :RETURN
1610 IF (B(4)=BB(16)ORB(16)=BB(B)ORB(8)=BB(4))AND(B(4]<>BB(4)AND
B(16)<>BB(16)ANDB(8]<>BB(8)) THEN GOSUB2010 :RETURN
1620 IF (B(16)=BB(4]ORB(8)=BB(16)ORB(4)=BB(B))AND(B(16)<>BB(16)A
NDB(8)<>BB(8)ANDB(4)<>BB(4)) THEN GOSUB2020 :RETURN
1630 K$="18":GOSUB2100 :NEXT:RETURN
1640 K$="23":GOSUB2100 :FOR L=1 TO 3
1650 IF (B(8)=BB(2)ORB(2)=BB(12)ORB(12)=BB(8))AND(B(8)<>BB(8)AND
B(2)<>BB(2)ANDB(12)<>BB(12)) THEN GOSUB1860 :RETURN
1660 IF (B(2)=BB[8)ORB(12)=BB(2)ORB(8)=BB(12))AND(B(2)<>BB(2)AND
B(8)<>BB(8)ANDB(12)<>BB(12)) THEN GOSUB1870 :RETURN
```

NEW HIGHER PRINTING SPEED, NEW LOWER PRINTER PRICE

High-speed printer

The Heath/Zenith 25 Printer is a heavy-duty, high-speed dot matrix printer that gives you sharp, clear printouts. It prints crisp, clear copy at speeds over 150 characters per second with quiet smoothness.

Baud rates from 110 to 9600 are user-selectable.

Versatile printer

The 25 prints the entire 95-character ASCII set in upper case and lower case with descenders, in a 9x9 matrix. Also, 33 block graphic characters – which are compatible with the Heath/Zenith 89 All-In-One Computer and the 19 Smart Video Terminal – let you create graphs and charts. All functions and timing are microprocessor-controlled.

Plug-in ribbon cartridges make ribbon replacement a no-mess snap.

The 25 works with most computers and terminals – using an RS-232C Serial Interface or a 20 mA current loop with handshaking control signals.

Low-priced printer

The 25 has all the features you've been looking for in a high quality, high-speed dot matrix printer – for only $1095 in kit form, or for only $1595 assembled and tested.

Free demonstration awaits you at your Heathkit Electronic Center †

Pick the store nearest you from the list below. And stop in today for a demonstration of the new Heath/Zenith 25 Printer. If you can't get to a store, send $1.00 for the latest Zenith Data Systems Catalog of assembled commercial computers. We'll also send you a free copy of the latest Heathkit® catalog. Write to Heath Company, Dept. 335-924, Benton Harbor, MI 49022.

HEATH/ZENITH ↗47

Your strong partner

*150 characters per second

Visit your Heathkit Electronic Center†

Where Heath/Zenith Products are displayed, sold and serviced.

PHOENIX, AZ 2727 W Indian School Rd 602-279-6247
ANAHEIM, CA 330 E Ball Rd 714-776-9420
CAMPBELL, CA 2350 S Bascom Ave 408-377-8920
EL CERRITO, CA 6000 Potrero Ave 415-236-8870
LA MESA, CA 8363 Center Dr 714-461-0110
LOS ANGELES, CA 2309 S. Flower St. 213-749-0261
POMONA, CA 1555 N. Orange Grove Ave. 714-623-3543
REDWOOD CITY, CA 2001 Middlefield Rd 415-365-8155
SACRAMENTO, CA 1860 Fulton Ave 916-486-1575
WOODLAND HILLS, CA 22504 Ventura Blvd 213-883-0531
DENVER, CO 5940 W 38th Ave 303-422-3408
AVON, CT 395 W Main St (Rt 44) 203-678-0323
HIALEAH, FL 4705 W 16th Ave 305-823-2280
PLANTATION, FL 7173 W Broward Blvd 305-791-7300
TAMPA, FL 4019 W Hillsborough Ave 813-886-2541
ATLANTA, GA 5285 Roswell Rd 404-252-4341
CHICAGO, IL 3462-66 W Devon Ave 312-583-3920
DOWNERS GROVE, IL 224 Ogden Ave 312-852-1304
INDIANAPOLIS, IN 2112 E 62nd St 317-257-4321
MISSION, KS 5960 Lamar Ave 913-362-4486
LOUISVILLE, KY 12401 Shelbyville Rd 502-245-7611
KENNER, LA 1900 Veterans Mem Hwy 504-467-6321
BALTIMORE, MD 1713 E Joppa Rd 301-861-4446
ROCKVILLE, MD 5542 Nicholson Lane 301-881-5420
PEABODY, MA 242 Andover St (Rt 114) 617-531-9330
WELLESLEY, MA 165 Worcester Ave (Rt 9) 617-237-1510
DETROIT, MI 18645 W Eight Mile Rd 313-535-6480
EAST DETROIT, MI 18149 E Eight Mile Rd 313-772-0416
HOPKINS, MN 101 Shady Oak Rd 612-938-6371
ST. PAUL, MN 1645 White Bear Ave 612-778-1211
BRIDGETON, MO 3794 McKelvey Rd 314-291-1850
OMAHA, NE 9207 Maple St 402-391-2071
ASBURY PARK, NJ 1013 State Hwy 35 201-775-1231
FAIR LAWN, NJ 35-07 Broadway (Rt 4) 201-791-6935
AMHERST, NY 3476 Sheridan Dr 716-835-3090
JERICHO, LI, NY 15 Jericho Turnpike 516-334-8181
ROCHESTER, NY 937 Jefferson Rd 716-424-2560
N. WHITE PLAINS, NY 7 Reservoir Rd 914-761-7690
CLEVELAND, OH 28100 Chagrin Blvd 216-292-7553
COLUMBUS, OH 2500 Morse Rd 614-475-7200
TOLEDO, OH 48 S. Byrne Rd 419-537-1887
WOODLAWN, OH 10133 Springfield Pike 513-771-8850
OKLAHOMA CITY, OK 2727 N W Expressway 405-848-7593
FRAZER, PA 630 Lancaster Pk (Rt 30) 215-647-5555
PHILADELPHIA, PA 6318 Roosevelt Blvd 215-288-0160
PITTSBURGH, PA 3482 Wm Penn Hwy 412-824-3564
WARWICK, RI 558 Greenwich Ave 401-738-5150
DALLAS, TX 2715 Ross Ave 214-826-4053
FORT WORTH, TX 6825-A Green Oaks Rd 817-737-8822
HOUSTON, TX 1704 W Loop N 713-869-5263
SAN ANTONIO, TX 7111 Blanco Rd 512-341-8876
MIDVALE, UT 58 East 7200 South 801-566-4626
ALEXANDRIA, VA 6201 Richmond Hwy 703-765-5515
VIRGINIA BEACH, VA 1055 Independence Blvd 804-460-0997
SEATTLE, WA 505 8th Ave N 206-682-2172
TUKWILA, WA 15439 53rd Ave S 206-246-5358
VANCOUVER, WA 516 S E Chkalov Dr #1 206-254-4441
MILWAUKEE, WI 5215 W Fond du Lac 414-873-8250

†Heathkit is a registered trademark of Heath Company. Heath Company and Veritechnology Electronics Corporation are wholly-owned subsidiaries of Zenith Radio Corporation. Heathkit Electronic Centers are operated by Veritechnology Electronics Corporation.

CP-208

↗See List of Advertisers on page 338

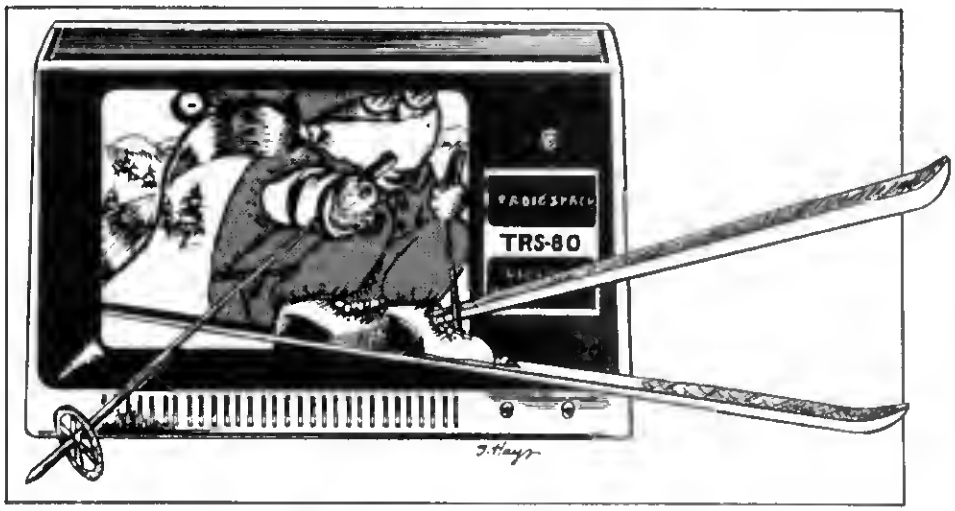
The Key Box

Model I or III
Cassette Basic
4K RAM

Break a leg!

Ski Slalom

by Jake Commander
80 Micro Technical Consultant



No klingons, spece-meenies or enargwerdlers; in fact there's nothing extreterrestrial about this game. Your feet are planted firmly on the ground, your skis waxed and you're about to plunge et 100 mph through 200 awkwerdly placed flegs on the side of a cliff. I promise no broken bones; just an ego or two. This is all the fault of Kerry Leichtman—our games issue editor—who forced me (at the risk of my career) to come up with something for thie issue.

This has been lying around unpleyed for over three yeers and I'd forgotten how much fun it is. It won't take much typing in and it will even run in 4K. There are three levels of difficulty; the third one is pretty challenging. In fact, I have e sneaky feeling some bends et level three are impoesible to negotiate. You'll elways have an excuse why you didn't get a perfect score. Or you can try again. You might be sorry.

You're elways offered the option of attempting the course again. This wey you will either become addicted or quickly leeve the computer with your eyes crossed. One of the strange things that happens, efter attempting a elope or two, is you are suddenly inflicted with the illusion that you're traveling backwards. This doesn't make it any easier to steer a true course—but who wants it to be too easy? You're on your own. Break a leg. No, that's not right. Enjoy it.

Here's a breakdown of the program. Line 130 sets the course length at 200 flags; chenge this value to either increase or decreese the length. Line 150 sets up the simple string grephics—e pair of skis end two flags. Line 160 eets the degree of difficulty according to your current stete of recklessness.

The value input to variable ZD, at this point, determines how severely the course direction changes. A value of one gives you a feirly gentle course, whereas a velue of three will give you motion sickness.

If you're feeling sneaky, change the ZD>3 at the end of line 160 to ZD>4. This will give you (better yet an unsuspecting triend) a course that is physically impossible to negotiate, providing e new slant to the game (if you'll excuse the pun). It's kind of like trying to ski down Mount Everest from the top: there's no way you'll get to the bottom alive, but whoever does it and dies the least amount of times is the winner. You'll be sorry.

Lines 170–200 plot the course into the integer arrey ZC. The degree of difficulty changes both the severity of the curves and the length of each new direction. Once the course is plotted, lines 210–230 throw you headlong into possible destruction.

Lines 250 and 260 scan the keyboard using the PEEK function for the left or right arrows for steering. The INKEY$ function would have been the more correct statement to use at this point, but it slows the program intolerably.

Line 270 displays your latest score at the top of the screen. As the display is constantly scrolling, it's necessary to show this score as each new flag comes into view. Your score equals the number of flegs you've knocked down. In other words, a perfect score is zero.

Line 270 also does a numerical check to see that your skis ere within the flags. If so, it returns to the main code at lines 220 and 230. If not, it drops down to line 260 where

your offending move is flashed to cause you maximum pain and embarrassment. Your skis are then automatically planted centrally between the two flags and you're sent on your way to continue the course.

Walking the course is not permitted, nor is taking the chairlift down. On some courses, it may be a disadvantage to be relocated in the middle of two flags in which case, tough luck! You'll have to be more careful. Blame it all on Kerry Leichtman. Then he'll be sorry.■

```
100 CLS:PRINT@22,"TRS-80 Slalom Run"
110 PRINT@06,"By Jake Commander"
120 PRINT:PRINT@210,"To go LEFT, press left arrow":PRINT@273,"To
 go right, prees right arrow":PRINT@336,"Otherwise skis go strai
ght ahead."
130 DEFINTL-Z:L=200:DIMZC(L+7)
140 YD=RND(3)-2:IFYD=0THEN140
150 DEFSTRA-F:A=CHR$(170)+CHR$(170):B=CHR$(171):C=CHR$(151)
160 PRINT@512,;:INPUT"Degree of difficulty (1,2 OR 3)";ZD:IFZD<0
ORZD>3THEN160
170 Y=0:Z=1:CLS:PRINT@22,"Plotting new course"
180 Y1=RND(ZD*2+1)-3:YD=-YD
190 X=RND(6/(ABS(Y1)+1))+RND(2):IFX+1=Z1THEN190ELSEFORZ1=1TOX:Y=
Y+Y1*YD:IFABS(Y)>25YD=-YD:Y=Y+Y1*YD
200 ZC(Z)=Y:Z=Z+1:IFZ<L+1NEXT:GOTO180
210 CLS:U=0:X=0
220 FORZ=1TOL:PRINT@985+ZC(Z),B:GOSUB250:PRINT@996+ZC(Z),C:GOSUB
250:NEXT
230 FORZ=ZTOZ+6:PRINT@1023,:GOSUB250:PRINT@1023,:GOSUB250:NEXT
240 PRINT@192,"Same course";:INPUTD:D=LEFT$(D,1):IFD="E"THENENDE
LSEIFD="Y"ORD="y"THEN210ELSE160
250 IF(PEEK(14400)AND32)=32X=X-1
260 IP(PEEK(14400)AND64)=64X=X+1
270 PRINT@60,U;:PRINT@30+X,A;:IFZ<0THENRETURNELSEIFABS(ZC(Z-7)-X
)<5RETURN
280 FORZZ=1TO7:PRINT@30+X,"**";:PRINT@30+X,A;:NEXT:X=ZC(Z-7):U=U
+1:RETURN
```

Program Listing

PROGRAM EPROMS AND PROMS WITH YOUR TRS 80-III!

EP-10 WILL PROGRAM POPULAR EPROM TYPES 2716 (5 VOLT), 2732 OR ANY EQUIVALENT PLUS POPULAR PROM TYPES 82S123, 82S129 FROM YOUR RADIO SHACK MODEL III. EP-10 COMES WITH MENU DRIVEN SOFTWARE FOR SIMPLE SINGLE KEY COMMANDS! EP-10 CONNECTS TO EXISTING 50 PIN CONNECTOR SO THERE IS NO EXTRA COST FOR A SERIAL PORT!

Riverlake Systems, Inc.

P.O. BOX 1927 • ROSWELL, GA. 30077 $279.95

PHONE 404-475-0028 ✓436

Houston's Software Store

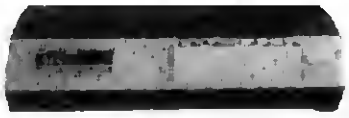
MICRO SOLUTIONS, INC.

Color Computer Software • Model 1 • Model III • Model II & CP/M

9949 E. Harwin / Houston, Texas 77036 / (713) 789-5443

NEC PC-8023A-C

Dot Matrix Printer



$494.88 UPS DELIVERED

- 100 characters per second
- Adjustable tractor & friction feed
- Proportional spacing & true descenders
- Hi-Res, dot-addressable graphics
- 5 fonts, 8 sizes & Greek/Math characters
- Subscript, Superscript & underlining

IDS Printers

IDS PRISM 80 w/Sprint Mode, Dot Plot, and Cut Sheet Feeder $1009.00
IDS PRISM 132 includes all the above plus 4-color graphics $1714.00

Smith-Corona Printer

TP-1 DAISY WHEEL PRINTER (Parallel or RS-232C), 10 or 12 pitch $699.00

Okidata Printers

MICROLINE 82A $474.00
MICROLINE 83A $739.00
MICROLINE 84 (Parallel) $1084.00
MICROLINE 84 (RS-232C) $1214.00

NEC Printers

NEC 3510/3530 Spinwriter (Parallel or RS-232C) 35cps $1904.00
NEC 7710/7730 Spinwriter (Parallel or RS-232C) 55cps $2559.00

Epson Printers

MX-80 w/GRAFTRAX $479.00
MX-80/F-T w/GRAFTRAX $589.00
MX-100 ..... $744.00

C.Itoh Printers

C.ITOH PRO WRITER (Parallel) $509.00
C.ITOH PRO WRITER (Parallel & RS-232C) 3K print buffer, 120 cps $664.00
C.ITOH F-10 STAR WRITER Daisy Wheel (Parallel or RS-232C) 40cps ... $1499.00

Cables and interfaces available for the APPLE, ATARI, CBM/PET, IBM, OSBORNE, and TRS-80.

Orders & Information:

CALL (603)-673-8857

Orders Only: CALL (800)-343-0726

No Hidden Charges

No surcharge for credit cards—No charge for UPS shipping—Stock shipments next day
All equipment shipped factory fresh with manufacturer's warranty—We accept CODs

Prices subject to change

HIGH TECHNOLOGY AT AFFORDABLE PRICES

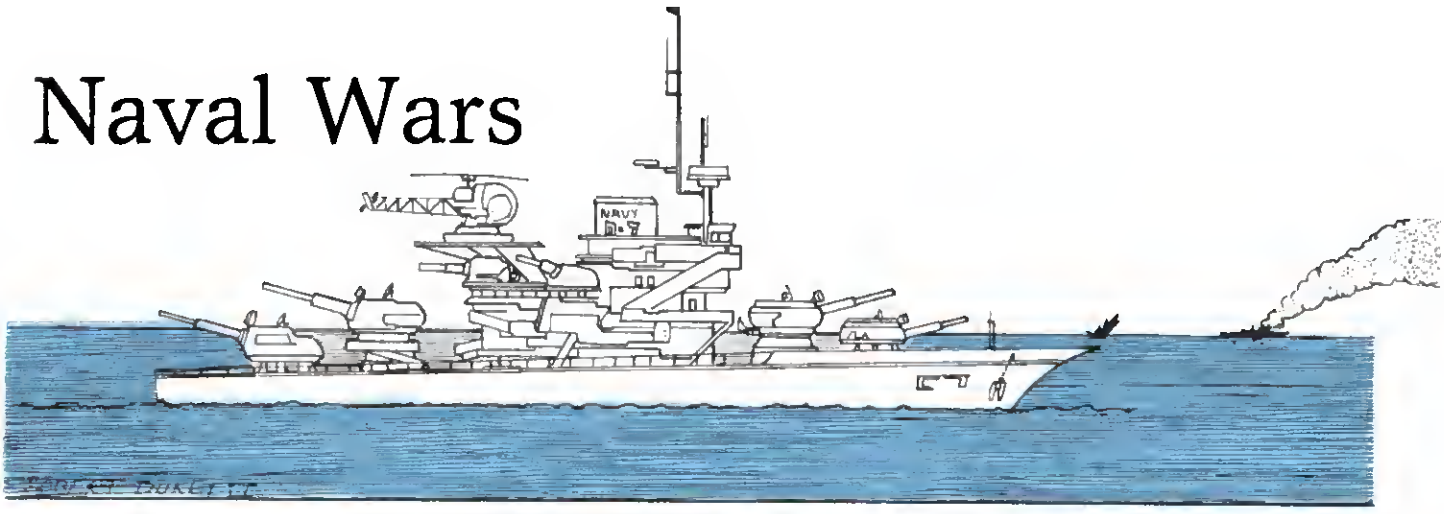
THE BOTTOM LINE ✓302

Elm Street, Milford NH 03055-0423

✓See List of Advertisers on page 338

This one is so good you need two computers.

Naval Wars



Arthur J. Byrnes
P.O. Box 478
Holly Hill, FL 32017

To play Naval Wars you need a 16K Model I or III and a friend (or enemy) with a 16K Model I or III. The computers do not have to be the same, but if you use a Model I with a Model III, set the Model III for 500 baud tape.

In Naval Wars both computers run the same program simultaneously.

The program does not use any machine-language subroutines. It is fun to play and even more fun watching the two machines talk to each other.

Connecting the Micros

Put the two TRS-80s back to back. Set up the cassette recorders as normal. (It is best to turn off or unplug your disk drives and use Level II Basic.) Load the program into both computers. Then remove the black plug from your recorder and the black plug from your partner's recorder; plug in yours where his was and his where yours was. Make sure not to remove the gray plugs. Open the cassette door and push in the tab at the left rear. Hold it in while pushing down the record and play buttons. If the record button will not go down you're not holding the tab in far enough.

Now recheck your connections. Everything should be normal except that your black plug is plugged into your friend's recorder and his black plug is plugged into your recorder and both recorders are in the record mode.

By using cassette recorders

10–95	Graphics variable assignment
100–150	Introduction display
160–170	Battle area mapping
160–350	Ship placement
370–380	Sets timing between computers
400–430	Fires at other computer
435–450	Receives hit or miss data
500–530	Receives fire from other computer
540–550	Determines location of incoming fire
560–570	Determines hit or miss
600–680	Determines which ship was hit
690–700	Determines if ship has been sunk
800–830	Determines location of input
900–930	Determines if ship is too close to border

Table 1. Program Breakdown

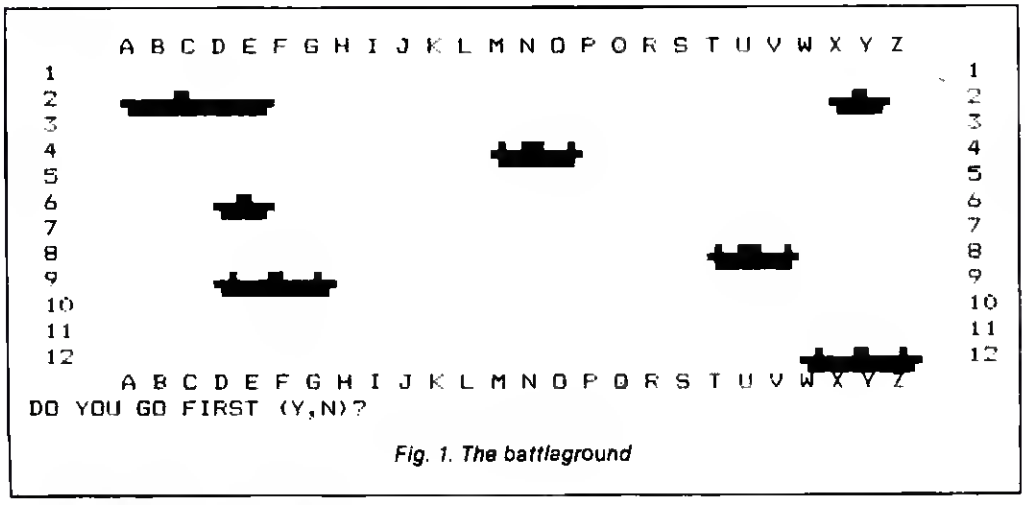


Fig. 1. The battleground

The Key Box

Level II Basic
Model I or III
16K RAM

Circle 542 on Reader Service card.

DAYSTAR
LIGHT-YEARS AHEAD

Daystar can transform your TRS-80 into a system ahead of its time. By increasing the speed and data capacity of your TRS-80, Daystar allows your microcomputer to grow as you do.

Your TRS-80 can perform up to 9 times faster. How? Through the use of an intelligent controller using I/O Ports and on-board data buffer feature.

In addition to increased speed, Daystar expands the storage capacity of your TRS-80, with 6.4 megs and 12.8 megs of unformatted storage in a 5½ Winchester. Each controller will handle up to 4 drives. A 1 megabyte floppy back-up is also available.

You can trust Daystar to deliver advanced technology, ahead of its time, at a price that beats todays market.

- TRS-80 MODEL I*
- VIC-20*
- S-100
- Apple II*
- Commodore*
- IBM P.C.*
- Heath/Zenith 89
- Xerox*
- Nec 8000*

* and soon Apple III*, TRS-80 III*

prices: $1900.00 for 6.4 megs. $2200.00 for 12.8 megs.

Dealer inquiries invited

asap computer products, inc.

[illegible]

ASAP COMPUTER PRODUCTS LTD.

[illegible]

DAYSTAR TECHNOLOGY INC.

[illegible]

with autometic level controls we ere abie to buffer the computers' Inputs and outputs. Tebie 1 breeks the program down for you.

To Play

Type Run and press Enter on both computers. The first display will show the different ships and how many you get. The next display shows the battle area and asks you to place your ships (Fig. 1). As you enter the coordinates, the computer displeys the ship in its location. Coordinetes must be entered letter first, then the number with no spaces in between. Once the ships are in place, the computer will ask you if you go first. Make sure you enter different letters (Y or N), since this statement sets up the timing between the computers. There is no advantage to going first. If you do both type the same letter, press Reset on both computers and rerun the program.

The strategy is to destroy your opponent's ships before he destroys yours. Some ships can take more hits than others.

If the computers lock-up press Reset, check the recorder connections and volume levels and rerun the program. ■

Arthur Byrnes is employed by Racal Decca Marine Inc.

Program Listing

```
10 REM BATTLESHIP
20 REM ARTHUR J. BYRNES
0/19/01
P.O.BOX 478
HOLLY HILL FLA. 32017
30 CLS:PRINT"WELCOME TO THE GAME OF BATTLESHIP.
35 CLEAR150
40 Q$=STRING$(60," ")
75 B$=CHR$(172)+CHR$(189)+CHR$(188)+CHR$(190)+CHR$(189)+CHR$(188
)+CHR$(190)+CHR$(156)
85 D$=CHR$(172)+CHR$(190)+CHR$(189)+CHR$(156)
90 A$=CHR$(172)+CHR$(188)+CHR$(188)+CHR$(190)+CHR$(189)+CHR$(188
)+CHR$(188)+CHR$(188)+CHR$(188)+CHR$(156)
95 C$=CHR$(174)+CHR$(188)+CHR$(191)+CHR$(189)+CHR$(188)+CHR$(157
)
100 PRINT@128,"TBESE ARE YOUR SHIPS AND QUANTITY (N) ."
110 PRINT@256,A$,"AIRCRAFT CARRIER   (1)"
120 PRINT@384,B$,"BATTLE SHIP        (2)"
130 PRINT@512,C$,"DESTROYER          (2)"
140 PRINT@640,D$,"P.T. BOAT          (2)"
150 PRINT@832,:INPUT"PRESS ENTER TO CONTINUE";
155 CLS
160 FORX=64TO768 STEP64:Y=Y+1:PRINT@X,Y;:PRINT@X+60,Y;:NEXTX
165 Y=64
170 FORX=6TO56 STEP2:Y=Y+1:PRINT@X,CHR$(Y);:PRINT@X+832,CHR$(Y);
:NEXT
180 PRINT@832,:INPUT"WHERE WOULD YOU LIKE YOUR AIRCRAFT CARRIER"
;I$
181 Z$=LEFT$(I$,1)
182 IFZ$="W" OR Z$="X" OR Z$="Y" OR Z$="Z" GOSUB900:GOTO180
190 GOSUB800
195 G=L
200 PRINT@L,A$;
210 PRINT@832,:INPUT"WHERE WOULD YOU LIKE YOUR FIRST BATTLESHIP"
;I$
220 GOSUB800
222 Z$=LEFT$(I$,1)
223 IFZ$="X" OR Z$="Y" OR Z$="Z" GOSUB900:GOTO210
225 H=L
230 PRINT@L,B$;
240 PRINT@832,:INPUT"WHERE WOULD YOU LIKE YOUR NEXT BATTLESHIP
";I$
241 Z$=LEFT$(I$,1)
242 IFZ$="X" OR Z$="Y" OR Z$="Z" GOSUB900:GOTO240
245 GOSUB800
247 J=L
250 PRINT@L,B$;
260 FORX=1TO2
265 PRINT@896,Q$;
270 PRINT@896,"WHERE WOULD YOU LIKE DESTROYER #";X;:INPUTI$
275 Z$=LEFT$(I$,1)
276 IFZ$="Z" OR Z$="Y" GOSUB900:GOTO270
280 GOSUB800
282 K(X)=L
285 PRINT@L,C$;
290 NEXT
```

Program continues

ANNOUNCING

the

UCSD p-System

for your

TRS-80 Model II or III[§]

Now you can write programs in

Pascal FORTRAN BASIC

and run them on

Altos, Apple, Commodore, Cromemco, DEC, IBM, Intertec, Philips, Ohio Scientific, Radio Shack, Terak, Texas Instruments, Vector Graphic, Xerox, Zenith, and many more...without change![†]

Package includes operating system, compiler, file handler, interpreter, editors, assembler, linker and documentation for $600.00. TRS-80 Model II p-System, Pascal compiler and Corvus (5, 10, 20 Mb) hard disk software for $800.00. Free catalog of p-System application software available. Contact us for details.

PCD Systems ↙433
P.O. Box 143
Penn Yan, N.Y. 14527
(315)-536-7428

*trademark of the Regents of the University of California.
§trademark of Tandy Corporetion
†PCD Supports Systems Software on DEC LSI-II, Redio Shack Models II & III, Altos & Terak only.

↙See List of Advertisers on page 338

Program continued

```
300 FORX=1TO2
310 PRINT@896,Q$;
320 PRINT@896,"WHERE WOULD YOU LIKE P.T. BOAT #";X;:INPUTI$
330 GOSUB800
335 M(X)=L
340 PRINT@L,D$;
350 NEXT
360 PRINT@896,Q$;
370 PRINT@896,;:INPUT"DO YOU GO FIRST (Y,N)";N$
380 IF LEFT$(N$,1)="N" GOTO500
400 REM FIRE SUB
410 PRINT@896,Q$;
420 PRINT@896,;:INPUT"YOUR TURN TO FIRE , ENTER POSITION";I$
430 PRINT#-1,I$
435 FORX=1TO25:NEXT
440 INPUT#-1,L,W$
450 PRINT@L+1,W$;
500 REM RECEIVE FIRE SUB
510 PRINT@896,Q$;
520 PRINT@896,"I N C O M I N G  F I R E
530 INPUT#-1,I$
540 GOSUB800
550 PRINT@L,"*";
560 GOSUB600
565 IFLEN(W$)>1 PRINT@L,W$;
570 PRINT#-1,L,W$
580 GOTO400
600 REM SCORE SUB
605 FORB=0TO10 STEP2
610 IFL=G+B PRINT@896,Q$;:PRINT@896,"HIT ON AIRCRAFT CARRIER":W$
="H":B=10:V(1)=V(1)+1:GOTO690
615 NEXTB
617 FORB=0TO0 STEP2
620 IFL=H+B PRINT@896,Q$;:PRINT@896,"HIT ON BATTLESHIP #1":W$="h
":V(2)=V(2)+1:GOTO690
630 IFL=J+B PRINT@896,Q$;:PRINT@896,"HIT ON BATTLESHIP #2":W$="h
":V(3)=V(3)+1:GOTO690
635 NEXTB
637 FORB=0TO6STEP2
640 IFL=K(1)+B PRINT@896,Q$;:PRINT@896,"HIT ON DESTROYER #1":W$=
"H":V(4)=V(4)+1:GOTO690
650 IFL=K(2)+B PRINT@896,Q$;:PRINT@896,"HIT ON DESTROYER #2":W$=
"H":V(5)=V(5)+1:GOTO690
655 NEXTB
657 FORB=0TO4STEP2
660 IFL=M(1)+B PRINT@896,Q$;:PRINT@896,"HIT ON P.T.BOAT #1":W$="
H":V(6)=V(6)+1:GOTO690
670 IFL=M(2)+B PRINT@896,Q$;:PRINT@896,"HIT ON P.T.BOAT #2";W$="
H":V(7)=V(7)+1:GOTO690
675 NEXTB
680 PRINT@896,Q$;:PRINT@896,"MISS":W$="M":RETURN
690 IFV(1)=5 THENW$="S U N K     ":L=G:G=0:V(1)=0:RETURN
691 IFV(2)=4 THENW$="S U N K ":L=H:H=0:V(2)=0:RETURN
692 IFV(3)=4 THENW$="S U N K ":L=I:I=0:V(3)=0:RETURN
693 IFV(4)=3 THENW$="SOUTU N K":L=K(1):K(1)=0:RETURN
694 IFV(5)=3 THENW$="S U N K":L=K(1):K(1)=0:RETURN
695 IFV(6)=2 THENW$="SUNK":L=M(1):M(1)=0:RETURN
696 IFV(7)=2 THENW$="SUNK":L=M(2):M(2)=0:RETURN
697 RETURN
800 REM LOC SUB
805 V=VAL(MID$(I$,2))
810 N=(ASC(I$)-62)*2
820 L=(V*64)+N
830 RETURN
900 REM CLOSE SUB
910 PRINT@896,Q$:PRINT@896,"SORRY , THAT WOULD PUT PART OF THE S
HIP ON LAND.  TRY AGAIN"
920 FORQ=0TO1000:NEXTQ
925 PRINT@896,Q$
930 RETURN
```

D E F I A N C E

****

THE FIRST TALKING SPACE SIMULATION)
(TALKS THROUGH THE CASSETTE PORT)

MESSAGE FROM STARFLEET COMMAND YOU HAVE BEEN GIVEN COMMAND OF THE U.S.S. DEFIANCE
A CONSTITUTION CLASS NK-IXA HEAVY CRUISER. A STATE OF WAR EXISTS BETWEEN THE UNITED FEDERATION OF PLANETS AND THE KLINGON EMPIRE. HOSTILE FORCES HAVE BEEN REPORTED ADVANCING ON STARBASE TWELVE. YOU ARE AUTHORIZED TO TAKE ANY ACTION YOU THINK APPROPRIATE TO DEFEND YOURSELF AND FEDERATION INTERESTS IN YOUR AREA

---

* GRAPHICS
* SOUND
* TALKS THROUGH CASSET PORT
* WORKS WITH JOY STICK OR ARROWS

P R I C E $24.95
48K MODEL I & III
SEE YOUR LOCAL DEALER

FANTASTIC SOFTWARE P.O. BOX 27735 LAS VEGAS, NEVADA 89126
MASTER CHARGE (702)-362 1457 ↙36 VISA

↙See List of Advertisers on page 338

Inside Leo Christopherson.

The Graphics King

by Steven Frann
80 Micro staff

Do you believe that dreams tell the future? In the case of Leo Christopherson, it's true. Leo teaches computers and math in the seventh and eighth grades. He pioneered fast animated graphics with his Android Nim program in 1978. Since then he has authored other successful graphics oriented game programs including Dancing Demon in which the demon, a graphics character, dances to the music and step patterns you program in, and Voyage of the Valkyrie, a blend of arcade and adventure games.

Leo was born in Spokane, Washington in June 1937. He tells about a dream he had when he was in grade school in the late 1940s: "When I went to sixth or seventh grade class sometimes it seemed I was a teacher and sometimes I was a student. When students went to school they would sit down in a little isolated booth. In front of them would be a keyboard and in front of that would be some way of presenting material to them. The teacher would have some kind of control console up front and would make sure each student was doing what he was supposed to be doing.

"That is a lot like a computer system. I didn't know what a computer was. It was vague in my mind what the student would be looking at because we didn't have tv back then in Spokane. I would see pictures of radar-like screens."

Is it just coincidence that Leo is now a teacher in a school district near his home in Tacoma, WA, and that he uses computers in some of his courses? What turned Leo's dream into reality?

Explosions

Leo grew up in Spokane, WA. He and his friends used to buy ingredients for gunpowder from a local drug store. "We tried to make the best kind of gunpowder we could figure out how to make. We spiked it up with powered magnesium and some other things.

"Sometimes I would spend three or four days putting together ships out of walnut shells and toothpicks and glue. I laid a planking across the ship and put a bunch of BBs in its bottom so it would float upright. Then I put a mast and rigging and sails on it. We'd dig some holes out in the back yard and flood them to make lakes. Then we put little gunpowder charges on the boats and push them in the water. And then we blew them up. It was fun to watch. But building the ships took a lot of time. I still have one of those boats left. I finally got old enough to respect all the work it took to build one of these things and I just couldn't blow that one up" (see Photo 1).

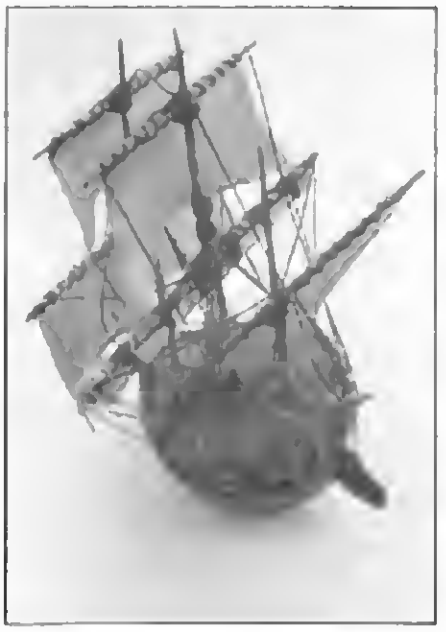


Photo 1. The surviving walnut shell boat

From these early experiments with gunpowder Leo caught the science bug. He studied physics at Washington State University for three years, dropped it, and eventually received a bachelor's degree in math. He became unhappy with what he had been told about the job prospects in the industry. He didn't want to sit around doing crossword puzzles while waiting for a superior to give him a problem to solve. So he decided to study languages. The problem with that was he didn't want to become a translator.

Leo left school for a year and returned to Spokane. After talking with an old friend he decided to become a teacher. "Teachers were in demand back then. The first job offer I got was in the school district here near Tacoma. I've stayed here ever since. It turned out to be a good place for a person who likes to involve himself in all sorts of things, but who is not an expert in any one of them."

Building Blocks

Just as Leo's experiments with blowing up walnut shell ships led him to study science and eventually become a teacher, other childhood experiences have come through in his computer games.

"When I was 8 or 10 years old my uncle gave me a set of stone blocks for a birthday present. The blocks were of various sizes and there were a limited number of each one. In order to put them all together you had to do quite a bit of planning. That was one of the best gifts I ever got. I really loved it. I worked and worked and worked on it. The kind of thinking involved there is important in programming."

Leo grew up with a lot of music around him. His parents had a radio/phonograph and a collection of 78s. He played them often. "It set something in my mind in terms of finding patterns in musical structure. When I was 10 they gave me an accordion.

"The accordion is a neat instrument for finding patterns in music. It took me quite a while to figure the thing out. They never gave me lessons. The whole left-hand bass section of the accordion is laid out in an interesting structure that is related to the chord structure by which music is generally patterned."

Of all his programs, Dancing Demon most embodies the spirit of these two childhood events. "Dancing Demon is an educational program. I wrote it to illustrate the same idea of the stone blocks where you have to fit one group of certain size things together with another group. In the case of Demon you have to put down the musical measures that have so many beats per mea-

DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIV

ES DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIV

CANADIANS

NOW IN STOCK

ADVENTURE INTERNATIONAL
ACORN SOFTWARE
APPARAT INC.
BIG FIVE
COMPUTERWARE
EPSON PRINTERS
INSTANT SOFTWARE
MARK DATA
MED SYSTEMS
FANTASTIC SOFTWARE
SPECTRAL
WORO PROCESSORS
BOOKS
DISK DRIVES
DISKETTES

LOWER CASE MOD — MOD I
$29.95 + $2.00 S & H

AND MORE

MOD I • MOD III • COLOR

Visa & Mastercard

Phone or Write for Catalogue
(403) 423-3919

CMD MICRO
10546 - 106 Street
Edmonton, Alberta
T5H 2X6

161

TECO MONITORS

RATED BEST BUY BY THE COMPUTER SHOPPER

NOW AN EVEN BETTER BUY

B & W MONITOR HIRES	119.95
GREEN PHOSPHOR HIRES	129.95
GREEN PHOSPHOR ULTRARES	144.95
TRS-80 CABLE	5.00
5¼" DISK DRIVES WITH PS & CASE	299.95

FROM

THE MAINE SOFTWARE LIBRARY
P.O. BOX 197
STANDISH, ME 04084

CHECK MO COO (20% DEPOSIT ON COO)
ADO $10 SHIPPING FOR MONITOR $6 FOR DRIVES

LNW-80-OWNERS

WE HAVE SOME TERRIFIC IDEAS AND PRODUCTS TO MAKE THIS GREAT COMPUTER EVEN BETTER. WRITE TO US FOR PACKAGE BEFORE YOU BUILD.

196

sure and you have to program the dance steps on top of that."

Cartoon Graphics

Leo's games are graphics oriented. This also has a root in Leo's childhood. "I liked to draw. I started getting Walt Disney comic books and I just loved the cartooning in them. I started trying to duplicate that. I drew cartoons and pictures all through grade school and junior high. The first thing I wanted to be was a cartoonist. I think that still shows up in my programs now. That's why they are so graphics oriented and why some people have called them cartoon graphics."

Leo bought a Level I TRS-80 computer when they first came out. When Level II became available in the Tacoma area he started the Android Nim program. In this program, the old game of nim is played using animated androids as the playing pieces. "I really wanted to try graphics. It started as an animation of little characters that would draw a gun and shoot.

"Reviewers have called my early games, Android Nim, Sneke Eggs, and Beewary, trivial. Beewary is a simple arcade type game. The player controls a bee and must fly it around carefully, trying to sting a spider before the spider jumps and gets the bee. These games are mostly experiments in graphics and other techniques. There is an entertainment factor involved in them. From the response I've received it seems people like to get the programs and take them apart to study the techniques used.

"Demon was the first game that wasn't really trivial. It requires you to think about what you're doing. The results depend on how well you understand the game. With something like Dancing Demon the more you put into it the better the results you get."

A Recipe for Games

Leo's Voyage of the Valkyrie is selling well through Advanced Operating Systems. In Valkyrie the player is a Space Viking with the job of capturing an alien controlled island. He must develop a map and find the island's castles. Arcade action is involved in capturing each castle. Wagner's music is used throughout the program.

"Valkyrie represents a step further in terms of programming something that is more a game than a graphics showpiece. The graphics in fact may be slightly less involved than in my other games."

If it's not the graphics, then what makes Voyage of the Valkyrie so special? "The books that are the most exciting to read for me are the ones that have a lot of action, then are slowly paced for a while to fill in the details and then have more action and so on. In computer programming the action part is an arcade type game and the slow part is a section where you have to figure out what you are going to do next."

Valkyrie combines both these elements. "You have the arcade action with the birds. You have to think about what you are going to do next as you explore the island and try to find where the castles are. Once you know all that, you still have to watch fuel levels and calculate how far away the castles are so you know you can get there and back. You have to figure out where you can make a refueling base so you can successfully knock off the last few castles. I think this balance between action and planning makes a good formula for a game and I intend to use this approach in a number of games I'm developing."

Leo is also doing some programming on the Color Computer. "It is a beautiful machine. The 6809 chip in there is fantastic. I hope to program some cartoon type, color, high-resolution graphics games for the Color Computer soon." Judging by his previous efforts we really have something to look forward to. Who says dreams can't come true?■

Photo 2. Leo Christopherson

TAKE THE NEXT STEP IN MICRO COMPUTER EVOLUTION.....
PUT THE LANGUAGE OF THE FUTURE ON YOUR COMPUTER TODAY.

Let ALCOR Pascal transform your computer into a truly professional development system.
No other language system offers as much power, efficiency, and versatility.

EASY TO LEARN

Alcor Pascal is easy to learn. It comes with a 250 page documentation package which includes a 100 page tutorial that introduces Pascal to the beginning programmer.

Also included in the language are many of the string functions that are familiar to Basic programmers.

SPEED

Important to many users is the fact that Alcor Pascal programs execute between 10-20 times faster than interpreted Basic programs.

ALCOR SYSTEMS SUPPORT

Alcor Systems stands behind its products with a free one year service contract that includes upgrades to new Alcor Pascal releases for a nominal fee. Also included free is a one year subscription to the Alcor Pascal Newsletter. Programs may be developed for resale that execute like stand alone machine language programs. (Absolutely no licensing fees!

COMPATIBLE COMPUTERS AND OPERATING SYSTEMS

48K memory / One disk drive Single or Double Density
(Two Drives Recommended)

TRS Model I
Trsdos 2.3, Ldos 5.1, Newdos 2.0, Dosplus 3.3, 3.4

TRS80 Model III
Trsdos 1.3, Ldos 5.1, Newdos 2.0, Dosplus 3.3, 3.4
Osborne - I CP/M
Apple II CP/M (Z-80 softcard)
Other Z-80 CP/M based systems (8" drives)

Pascal Features

A complete Jensen and Wirth Standard Pascal
Produces compact efficient code that executes 10-20 times faster than interpreted BASIC
Can compile large programs (40K lines +)
Fast one pass compiler
Simple commands for compiling and running programs
Supports separate compilation of procedures and functions
Compiler switch options including conditional compilation
Full heap support including NEW and DISPOSE procedures that perform true heap allocation
Complete implementation of sets with up to 256 members
Variant records are fully supported
Supports single and double precision REAL
Files are compatible with TRSDOS

250 Page Documentation Pkg.

Beginner's guide
Pascal Tutorial with 50 new Data Base programs
Source supplied on diskette
Pascal Reference Manual
System Implementation Manual
Text Editor Manual
Handy System Reference Card
Cross reference index for documentation package

The Best of Both Worlds

Pseudocode (Pcode) for compactness
Allows large programs in small memory space (8500 lines + programs can execute in 48K)
Native code for speed
Optional code generator produces Z80 assembler code
Pcode can be mixed with native code

Extensions

OTHERWISE clause in case statements
Identifiers may contain '$' and '_' characters
Automatic type conversion in arithmetic expressions and assignment statements
Constants may be expressed in decimal or hexadecimal
Characters within strings may be specified by ASCII codes
Allows non-printable characters in strings
Type transfer operator to override type restrictions
ESCAPE allows exit from anywhere in a procedure
LOCATE function returns the address of a variable
SIZE function returns the amount of memory for a variable

Full Screen Text Editor

Included with Pascal
No limit on file size except disk capacity

Optional Advanced Development Pkg.

Pcode optimizer
Reduces the size of a program by 5-15%
Increases execution speed
Z80 native code generator
Produces executable assembler native code for the Z80
Native code execution 2-3 times faster than Pcode
Native code can be mixed with Pcode to provide speed where required and still operate from the memory limits of Pcode

Linking Loader

Links separately compiled routines. Supports procedure and function libraries. Can create command files

Licensed
TRS-80 Trsdos Developers
Z-80 Digital Research Inc.
CP/M Programming
APPLE II Apple Computer Inc.
Osborne Osborne Computer Corp
ALCOR PASCAL ALCOR Systems

DEALER INQUIRIES INVITED

ALCOR SYSTEMS

801 W. Eastgate Avenue #100 ▶ Garland, Texas 75040
For immediate service call (214) 226-4410

EXPAND YOUR HORIZONS WITH ALCOR PASCAL

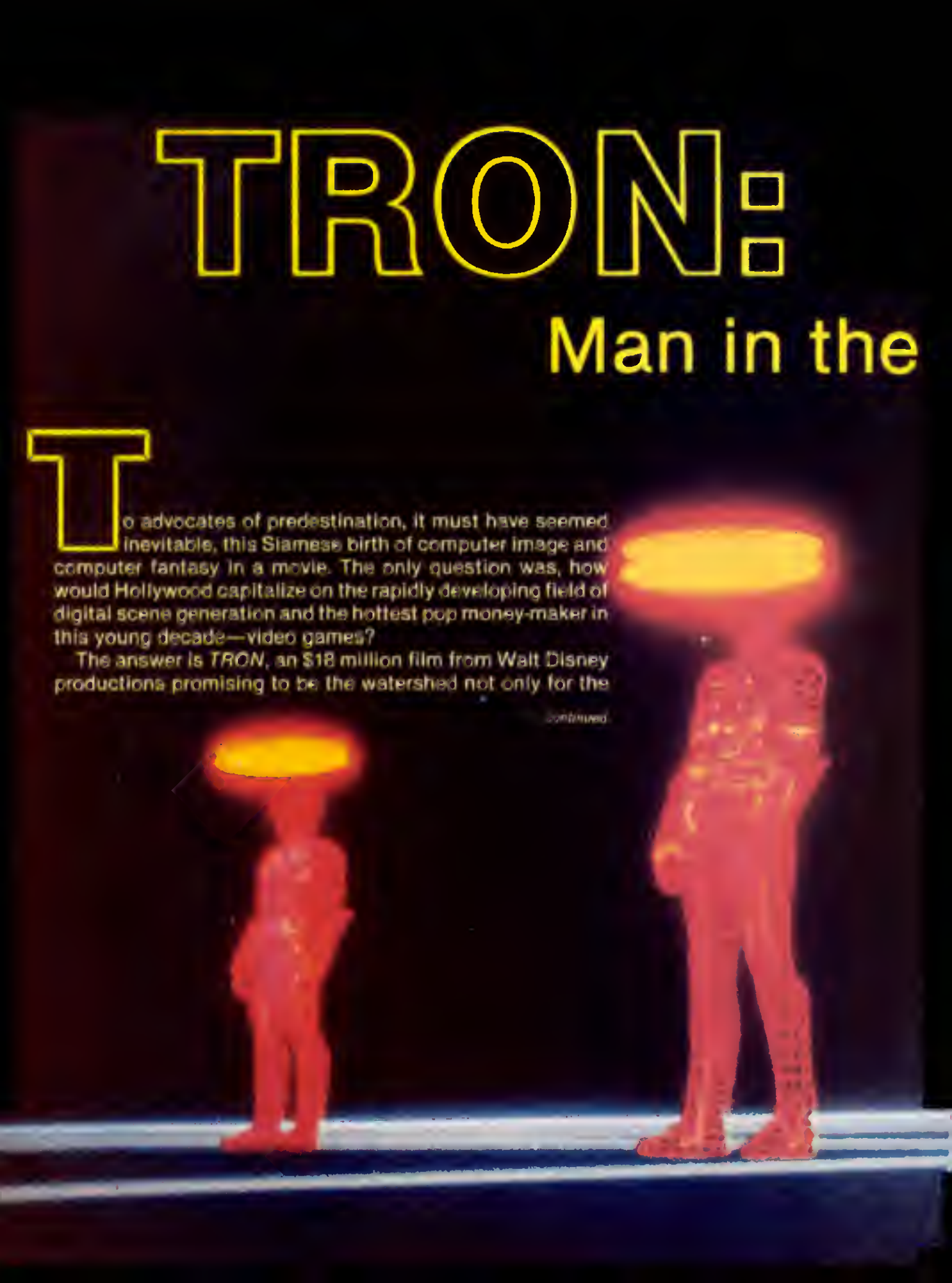
TRON:

Man in the

To advocates of predestination, it must have seemed inevitable, this Siamese birth of computer image and computer fantasy in a movie. The only question was, how would Hollywood capitalize on the rapidly developing field of digital scene generation and the hottest pop money-maker in this young decade—video games?

The answer is *TRON*, an $18 million film from Walt Disney productions promising to be the watershed not only for the

Continued



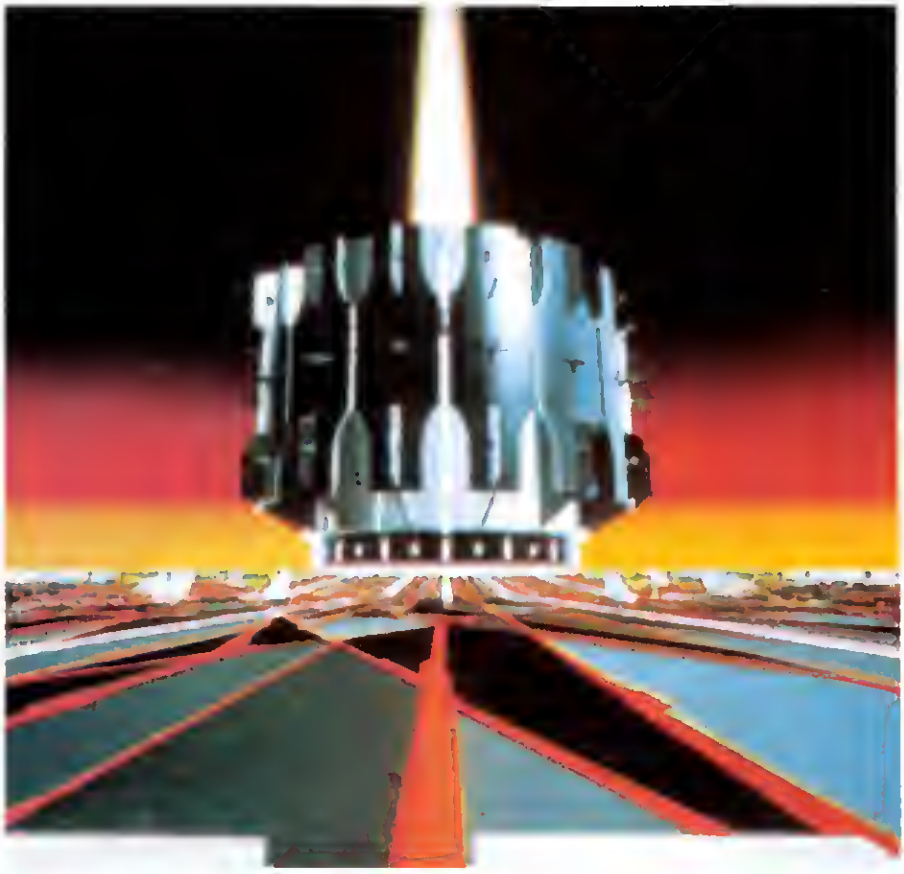
Computer

by John P. Mello Jr.
80 Micro News Editor

video game mania infecting the nation, but for computer-generated movie making. According to one science magazine, the film may be to the 80s what *2001: A Space Odyssey* was to the 60s and *Star Wars* was to the 70s.

Film-makers have used computers for years, but what sets off *TRON* from its predecessors is its blend of live action with computer-generated imagery. Computer imagery has been used as an "effect" in movies like *Star Wars*, *Looker* and *West World*, but in *TRON*, computer generated landscapes, buildings, and vehicles provide settings for live-action characters.

Makers of *TRON* are also setting it off from what is currently considered "computer animation." Said Larry Elin, one of the computer animators of the film: "People are calling 'motion control'—where you use a computer to control the activity of a real camera photographing a real object—computer animation. I don't think it is. If you start out with a picture, what is the computer creating? It isn't doing anything. It may be manipulating another image being fed in, but it isn't really generating anything."



A WORLD TO WOW THE EYE.

In *TRON*, Flynn—a wizard at programming video games—begins to suspect Dillinger—an executive of a communications conglomerate—of manipulating the cartel's computer system to pirate programs from other systems. When Flynn tries to break into the conglomerate's system, he's blasted into the computer, where he discovers a futuristic fantasy world (left) and teams up with the king of video warriors, Tron. Together the pair attempt to overthrow Dillinger's program which is threatening the real and electronic worlds. Combat in the electronic world is conducted on the game grid where warriors race into a fray on video motorcycles (lower left), light cycles (lower right), and in tanks (right). Photos from *TRON* © 1982 Walt Disney Productions.

In *TRON*, a sort of silicon *Fantastic Voyage*, "the computer is generating the picture based on mathematical descriptions of what's in it," said Elin, head of animation at the Mathematic Applications Group Inc. of Elmwood, NY, the single largest contributor of computer imagery to the movie.

A Fortran program inside MAGI's computers, Elin explained, contains descriptions of shapes that are simple—spheres, cones, cylinders, boxes, ellipsoids—and some not so simple—the "terrain surface," which shapes hills and valleys, and the "general surface," which can be almost anything. He said: "We use these simple shapes as blocks to construct more complex things. You can build practically anything combining simple shapes."

After rendering an object in three views on graph paper, an animator begins punching code into the computer.

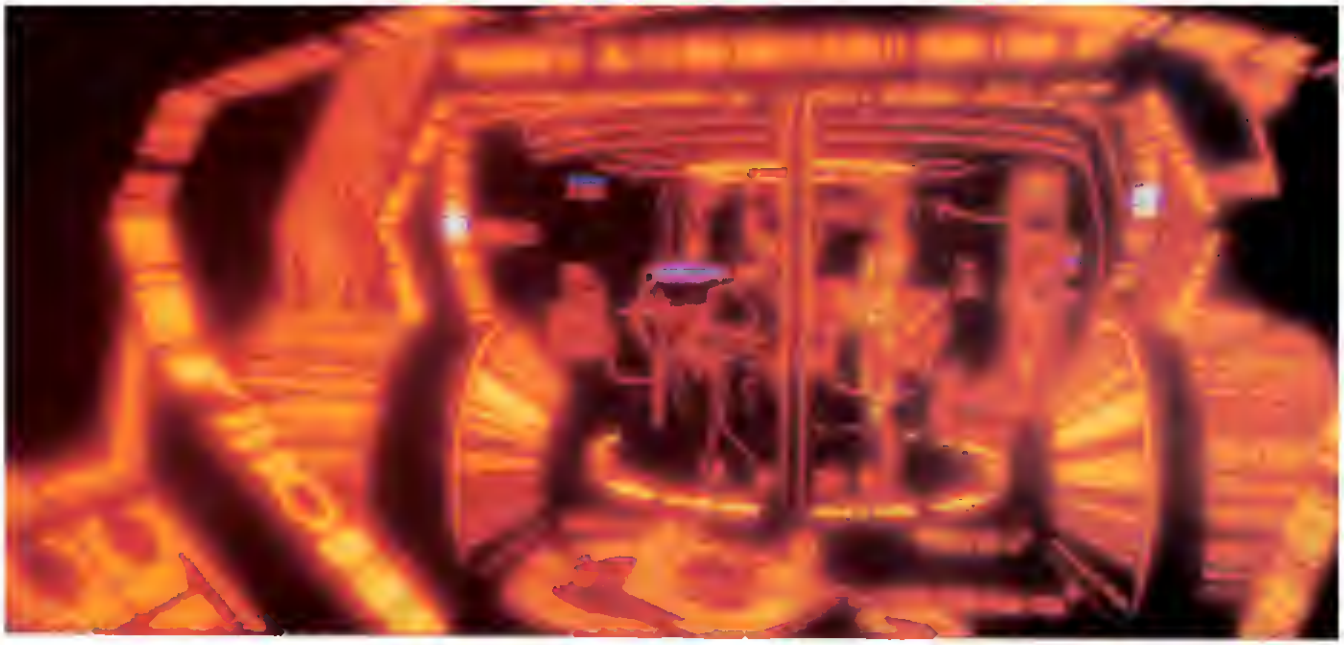
"Suppose we want a tank," Elin noted. "We tell the computer: Here's a tank. It consists of the following: a sphere located at x,y,z coordinates and radius x. All other parts of the tank will have equally simple input parameters."

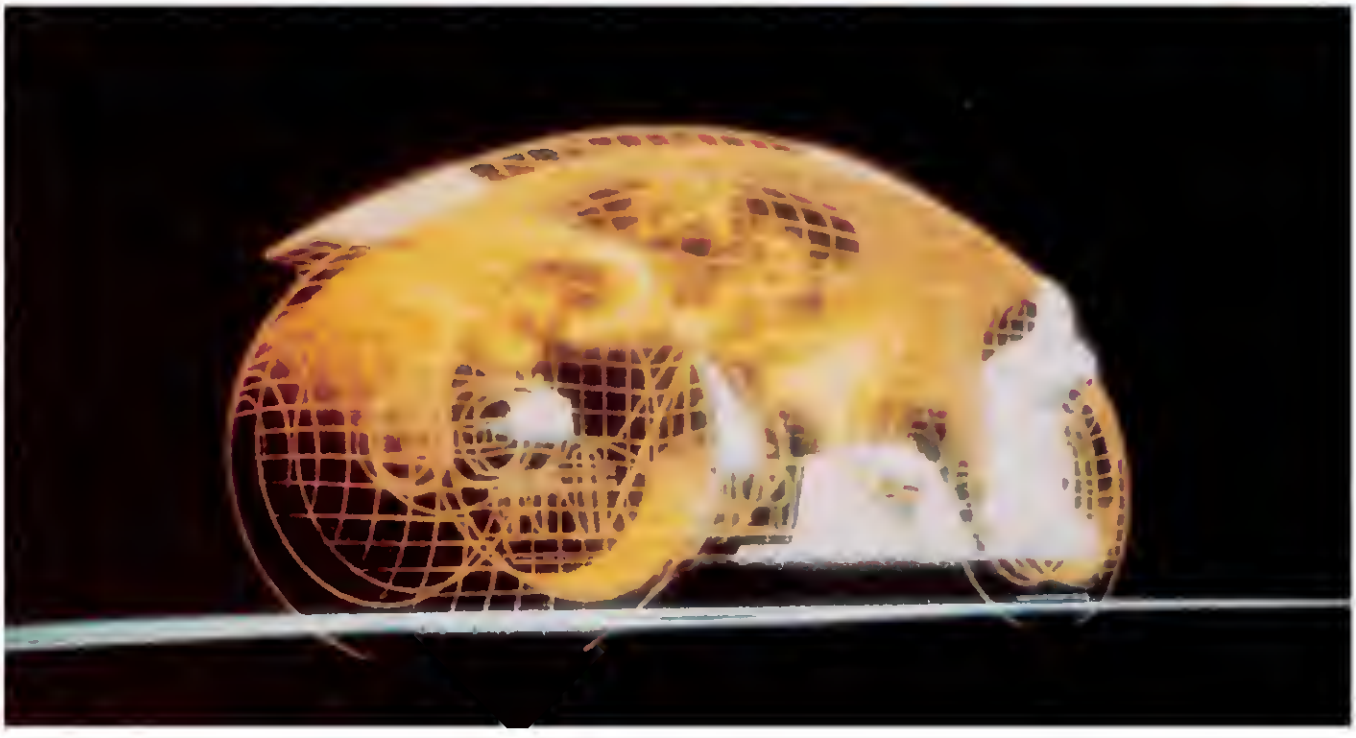
However, more than just an object's parameters are loaded into the machine because in digital image generation, real cinematic life is simulated—including camera and light sources. When an animator uses "director's language" to call up a scene on a specialized machine called a Chromatic 7900, it appears on the CRT as a three-dimensional object seen at a specified camera angle and focal length, with a light source at point x.

The initial images are line drawings—called "pencil sets"—shown at low resolution, 300 lines per screen. These are scrutinized for errors.

"The most common error at this point," Elin said, "is a typo. We just type in the wrong number and all of a sudden we've got a cylinder that's four miles long instead of a couple of inches."

Even at this simple stage, things can get complicated. The MAGI animator said: "In some scenes, we might have 500 lines of director's language when things are being





moved around, when we have 14 tanks and three light cycles and all kinds of things happening."

When the pencil sets are finalized, the animators can go a step further and colorize the frames. Each pixel on the Chromatic's CRT is assigned a color and intensity. Elin observed, "It's no different from the way they light the billboard in Times Square, except the billboard has maybe 8,000 lights and one of our monitors has over 2 million pixels."

For every frame of film, a pixel is assigned several values. When those values for the 2 million pixels are multiplied by 24—the number of frames in one second of film—nearly 100 million bits of information are needed for screen time that would be missed in the blink of an eye.

Once MAGI felt a scene jibed with the film's storyboards—frame-by-frame drawings of a scene—they transmitted it at 1200 baud via transcontinental modem hookup to Chromatics at Disney's studios in Burbank, CA. Elin said it took about an hour to transmit 100 frames, a little over four seconds of film. "When we filled their Chromatics," he said, "they could press a button and the animation would start." According to Disney, the transmission arrangement cut two-and-a-half to five days from the creation of each scene.

After Burbank viewed the scene, instructions to modify it would be sent to MAGI. "They'd make creative decisions," Elin said. "Usually they're based on what happens before this scene starts and after it ends. They want to develop a continuity."

He explained that the final product is displayed on a high resolution—1200 lines per screen—CRT: "We output the frames one at a time in color on a high resolution cathode ray tube. That output is photographed on a movie camera that is locked into position and staring down at the CRT."

"This is the first time anyone has done anything this large," he observed. *TRON* runs 105 minutes, 20 minutes of it computer-generated.

Elin's firm, whose computers have been making pictures since 1965, is the oldest of a handful of companies dealing in computer-generated animation. The head of MAGI's computer graphics division said of the companies: "Everyone's system was developed on their own. There is little technology that is shared. It's not like the automobile industry where one car is the same as another. In this industry, our work is easily identifiable as our work and other people's work is easily identifiable as theirs."

But *TRON* isn't a benchmark movie only because of its innovative special effects. It also is the first major film to use video games as its leitmotif.

TRON is set in two worlds: the real world, where a vast computer system in a communications conglomerate is controlled by a single program, and the electronic world, where electric-and-light beings want to overthrow the program controlling their lives.

In the real world, a computer genius, Flynn (played by Jeff Bridges), tries to break into the computer system of the conglomerate ENCOM. Flynn suspects an ENCOM executive, Dillinger (played by David Warner), is a softbuc who's pirated some of the video-game wizard's programs. When Flynn attempts his break-in, he's blasted into another dimension, inside the computer, where programs are the alter egos of the programmers that created them. Flynn teams up with Tron, the mightiest of the electronic warriors, to battle the minions of the master program on a monumental video game grid, where arcade amusements become life and death realities.

"I realized this was a new life form," writer-director Steven Lisberger told *Rolling Stone*, "that these little characters were running around doing unexpected things. I was also intrigued by the concept that there's this other reality quietly forming around us—the world of computers."

Lisberger, who with producer Donald Kushner conceived of *TRON* in 1978, added in a statement released by Disney: "We had played all the video games and when we investigated computer art, we realized that by combining the concepts of electronic games and computer imaging, we could bring something to life that hadn't been there before."

CONVERT YOUR SERIAL PRINTER TO PARALLEL

The UPI serial printer interfaces allow an ASCII serial printer to be connected to the parallel printer port on TRS-80 Models I, II and III.

Software compatibility problems are totally eliminated because the TRS-80 "Thinks" that a parallel printer has been attached. No machine language driver needs to be loaded into high memory. VISACALC, SCRIPSIT, BASIC, FORTRAN, etc. all work as if a parallel printer was in use.

The UPI interfaces are completely self contained and ready to use. A 34 conductor cable and connector plugs onto the parallel printer port of the Model I expansion interface or onto the parallel printer port on the back of Models II and III. A DB25 socket mates with the cable from your serial printer. The UPI interfaces convert the parallel output of the TRS-80 printer port into serial data in both the RS232-C and 20 MA. loop formats.

BINARY DEVICES
Formerly SPEEDWAY ELECTRONICS
11560 TIMBERLAKE LANE
NOBLESVILLE, IN 46060
(317) 842-5020

TRS 80 is a trademark of Tandy

VISA MasterCard

Switch selectable options include:
- Linefeed after Carriage Return
- Handshake polarity (RS232-C)
- Nulls after Carriage Return
- 7 or 8 Data Bits per word
- 1 or 2 Stop Bits per word
- Parity or no parity
- ODD or EVEN parity

NEW VARIABLE BAUD RATE MODELS

Switch selectable from 110-4800 BAUD
UPI-3VB for models I or II $159.95
UPI-2VB for model II $159.95

CLOSEOUT ON SINGLE BAUD RATE MODELS

Our UPI-2 and UPI-3 will drive virtually any ASCII serial printer.
UPI-3 for model I or III Closeout $109.95
UPI-2 for model II Closeout $109.95
Specify BAUD rate 50-4800. Quantities limited.

Shipping and handling on all orders. $4.00
90 day warranty on all interfaces
Ten day return privelege on UPI-3VB and UPI-2VB
Longer cables available

106

MORE BYTE PER BUCK

OUR LOW PRICES INCLUDE FREE SHIPPING
SATISFACTION GUARANTEED BY SIMUTEK

COMPUTERS

Complete MODEL III COMPUTER

Model III with 48K memory, 2 disk drives, 370K storage, and ready to run with TRSDOS 1.3 and manual. 120 day Simutek warranty parts and labor. Compatible with all Radio Shack software. $1899.99

Model III with 48K, 2 double sided 40 track disk drives with 750K storage. Comes with NEWDOS 80 V.2 and manual. 120 day Simutek warranty parts and labor. Compatible with Radio Shack software. Complete and ready to run. $2389.99

MODEL III FIVE MEGABYTE HARD DISK

Comes with modified DOSPLUS. No installation required. Just plug in 50 pin bus. Complete and ready to run. $2499.99

MODEL III INTERNAL DISK DRIVE KITS

If you can use a phillips screwdriver, you can easily install Simutek's Model III disk drives and controller in less then an hour. Absolutely NO SOLDERING, TRACE CUTTING OR TECHNICAL KNOWLEDGE REQUIRED! The J & M controller is the best on the market today. We've tried others and found J & M's the finest and easiest to install. We warranty the J & M controller for 120 days against defects in workmanship.

ONE 40 TRACK TANDON DISK DRIVE WITH 185K STORAGE, and J & M controller. Radio Shack DOS, manual. No soldering or trace cutting required. Ready to install with instructions $619.99

TWO 40 TRACK TANDON DISK DRIVES 370K STORAGE, with J & M controller Radio Shack DOS, manual. No soldering or trace cutting. Ready to install and run. Instructions. $889.99

TWO DOUBLE SIDED 40 TRACK DISK DRIVES with 750K storage and J & M controller, NEWDOS 80 V.2, and manual and Model III DOS. No soldering or trace cutting. Ready to install and run. Full instructions. $1299.99

DISK DRIVES

MODEL I DISK DRIVES

ONE TEC DISK DRIVE 40 TRACK DISK DRIVE with 5ms track to track access time, with power supply chassis, extender cable and shipping for TRS-80. One year warranty on parts and labor. Ten day money back guarantee.
Model I or III $279.00

ONE TEAC 40 TRACK DISK DRIVE, 30 ms track to track, with P/S and chassis, ready to run as drive 0-4. 10 day money guarantee. One year warranty $279.00

ONE TANDON 40 TRACK DISK DRIVE, 5 ms track to track, with P/S and chassis, ready to run as drive 0-4 or Model III external. 10 day money back warranty $279.00

ONE 2 DRIVE cable for Model I or III. (Specify) $25.00
ONE 4 DRIVE cable for Model I only $35.00

PRINTERS

Letter quality Daisywheel	
TEC C-itoh 40 CPS Parallel	$1599.99
TEC C-itoh 40 CPS Serial	$1649.99
TEC C-itho 45 CPS Parallel	$1799.99
TEC C-itoh 45 CPS Serial	$1899.99
TEC C-itoh tractor feed	$269.00
High quality dot matrix	
TEC C-itoh PROWRITER 8510	$539.99
Epson MX-80	$479.99
Epson MX-80 F/T	$599.99
Epson MX-100	$799.99
Epson Graphtrax	$89.99
Malibu 200 dual mode	$2695.99
Okidata microline 80	$369.99
Okidata microline 82A (Free tractor feed)	$599.99
Okidata microline 83A (Free tractor feed)	$799.99
Okidata microline 84 (Free tractor feed)	$1269.99

Printer Cable for Expansion interface or Model III computer $29.95

ACCESSORIES/ SOFTWARE, ETC.

16K MEMORY SET SPECIAL

$17.89 with instructions for MOD I, III Color 4K, Apple, Exidy, one year warranty 200 NS $17.89

MODEL I, III SOFTWARE

LDOS	$149.95
NEWDOS 80 Ver. 2.0	$139.00

DOSPLUS...NEW VERSION! $139.95
DISK HOLDER 5-1/4 ..... $21.95
PERCOM'S DOUBLER II and DoubleDOS. The best and easiest to install. Double density mod for Model I. $159.95

BOOKS **$21.95**

MICROSOFT BASIC DECODED AND OTHER MYSTERIES	$29.95
TRS-80 DISK AND OTHER MYSTERIES	$22.50
BASIC FASTER AND BETTER	$29.95
CUSTOM TRS-80	$29.95

SUPER MODEM

ESI Lynx smart modem for MOD I or III. Does not require RS-232. Auto answer/dial. Complete with terminal AND host programs. $279.95

Stop those headaches and eye strain! ZENITH GREEN SCREEN MONITOR and TRS-80 CABLE $149.00

SIMUTEK **HAS BEEN SATISFYING CUSTOMERS NATIONWIDE FOR THREE YEARS**

IF NOT FULLY SATISFIED WITH ANY HARDWARE FOR ANY REASON, RETURN WITHIN TEN DAYS FOR A FULL REFUND OR EXCHANGE. Sorry, no refunds on software.

QUESTIONS? WE KNOW TRS-80S CALL OUR TECHNICAL HOTLINE FOR QUICK AND PROFESSIONAL ANSWERS. (602) 323-9391

ORDERS RECEIVED TODAY ARE SHIPPED TOMORROW. IF AN ITEM IS TEMPORARILY OUT OF STOCK YOU ARE NOT CHARGED UNTIL IT IS SHIPPED.

USE OUR DIME TO ORDER TOLL FREE. (ORDERS ONLY)

(800) 528-1149

FREE SHIPPING ON ALL ORDERS!!

C.O.D.'S OVER $200 REQUIRE 10% DEPOSIT. ALL C.O.D.'S WILL REQUIRE CASH OR CERTIFIED CHECK FOR PAYMENT.

WE ACCEPT AMERICAN EXPRESS, VISA and MASTERCARD. NO SURCHARGE FOR CREDIT CARD ORDERS!

SORRY, PERSONAL CHECKS REQUIRE 4-5 WEEKS TO CLEAR.

SIMUTEK COMPUTER PRODUCTS INC.

4897 E. SPEEDWAY, TUCSON, ARIZONA 85712
(602) 323-9391 (800) 528-1149

TRS-80 IS A TM OF RADIO SHACK, A TANDY CORP.

12

The Boston Museum of Fine Arts school graduate added: "Everyone's looking for new fantasies in the movies. Outer space has been done to death. They've gone inside the body and under the sea. We've created a world in *TRON* by taking video games and just blowing them out to the point where they're reality. Video games were the basis for the fantasy; computer imagery was the means to create it."

"I'm fascinated with the idea of artificial graphics interacting with real people in a time mode," the Cunningham, PA, native told *Omni* magazine. "I've always been interested in video and computer games and I feel it's significant that the computer people and the video people are forming a bridge between the two camps. *TRON* is giving us a chance to create our own mythology, our own archetypal characters for the Computer Age."

He added: "Kids are going to learn how to relate to computers as users—not being subservient to them. But there are no myths about how people should relate to these new techniques. It's virgin territory. We can make up stories and tales and create those archetypes now with some help from Carl Jung. One of the characters in the electronic world, Ram, says, 'It gives me a great feeling helping people plan for their future needs.' That's how I feel about *TRON*. I want people to come out of it inspired, to think of technology as something that belongs to them. I'm very optimistic and benevolent toward technology."

Asked by *Omni* if the awesome special effects in *TRON* would make the film more gloss than substance, Lisberger, 31, replied: "There's a big temptation to wow them with special effects, but what we tried to do was create a balance between the machine aspects and the human aspects. We have to do that in film and in society and science, too. For me, the actor is the ultimate special effect. People get motivated by a story, not special effects. This isn't just a light show. We give reasons for why it looks like it does. To tell the story, we needed to do certain special effects. To tell another story, other effects might be more apropos. It's a matter of finding the technology to tell a story rather than forcing a technology to tell a story it's not right for. The medium is secondary, really. What's most important is understanding emotions and feelings."

More than the plot of *TRON* is tied to the $5 billion video game industry. Arcade giant Bally Manufacturing of Chicago has created a *TRON* video game and installed it in its 240 Aladdin's Castles across the country and in theaters showing the Disney film. And Mattel will have a *TRON* for its Intellivision while a hand-held version of the game will be marketed by Tomy.

Even if *TRON* doesn't become a screen classic, it will influence how movies are made in the future, according to its head of computer special effects. Richard Taylor told *Omni*: "Here we are walking on the moon and we're still making movies using 1920s technology. It's absurd. But *TRON* is going to change that."

"We have a unique opportunity on this film," he went on to say. "It's like nothing anybody's done before with a new technology. The industry badly needs new tools." He added *TRON* will probably lead to digital film printing, which is cheaper than existing methods.

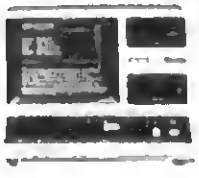
"The computer is like a magic hat," he said, "with an incredible number of magic tricks inside."

He added: "Even though the computer creates an image on a two-dimensional plane, it creates it in three-dimensional space and with perfect perspective, never a mistake in shape, and absolutely accurate. When you put that on the screen, there's something that innately connects to a human being subconsciously that tells him that it is perfect. Computer simulation can do all the things you can't do in reality. There are no physical limitations, no limits to point of view."■

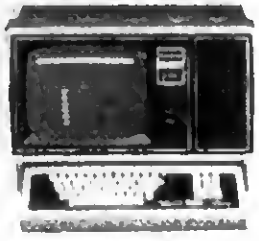
Lisberger: "Everyone's looking for new fantasies in the movies."

AUTHORIZED TRS 80® DEALER #R491

TRS-80 Color Computer With Extended Color BASIC



26 – 1062
Model III 16K RAM
Model III, BASIC
$815.00



26 – 4002
Model II, 64K

WE ACCEPT CHECK, MONEY ORDER, OR PHONE ORDERS WITH VISA OR MASTERCARD. SHIPPING COSTS WILL BE ADDED TO CHARGE ORDERS. DISK DRIVES, PRINTERS, PERIPHERALS, AND SOFTWARE—YOU NAME IT, WE'VE GOT IT. WRITE OR CALL FOR OUR COMPLETE PRICE LIST.

C & S ELECTRONICS, LTD. 32 EAST MAIN ST. MILAN, MICH. 48160

↙138 (313) 439-1508 (313) 439-1400

C & S ELECTRONICS MART IS AN AUTHORIZED TRS 80 SALES CENTER STORE #R491

RUN BASIC PROGRAMS AT SUPER SPEED WITH ZBASIC 2.2.

THE WORLDS FASTEST TRS-80 BASIC COMPILER from SIMUTEK

BELIEVE IT OR NOT WE'VE ADDED MORE NEW FEATURES to the ONLY INTERACTIVE BASIC COMPILER for the TRS-80!

1. Speed increases of 10–100 times are typical after compilation.
2. Compiled code can be RELOCATED to run anywhere in memory. Code is even ROMable!
3. ZBASIC 2.2 NOW SUPPORTS BOTH RANDOM and SEQUENTIAL DISK I/O.
4. ZBASIC 2.2 is now a super tool for business programmers. RANDOM ACCESS FILES, and PRINT USING statements are supported as well as a HIGH PRECISION MATH package (with no rounding problems).
5. Special BUILT-IN MACHINE LANGUAGE COMMANDS to increase program operation by as much as 1000 times! Special commands are implemented for fast memory searching (CPDR CPIR), block memory moves (LDIR, LDDR), inputting and printing HEX numbers, inserting MACHINE LANGUAGE into COMPILED CODE, disabling and enabling interrupts, inverting memory, 16 bit PEEKs and POKEs, and stack control, debug and much more.
6. ZBASIC 2.2 compiles the ENTIRE PROGRAM into to Z-80 machine language. (Not 8080 code or a combination of BASIC and machine language like some other compilers.) Clumsy LINKING LOADERS, and RUNTIME MODULES are not needed. ZBASIC 2.2 creates a ready to run MACHINE LANGUAGE program.
7. NO ROYALTIES imposed on registered ZBASIC owners.
8. Typical COMPILATION TIME is TWO SECONDS for a 4K program.
9. Use TRS-80 Basic to write ZBASIC programs!
10. Compile many existing programs with only minor changes. (Some BASIC programming experience is required.)
11. Fully compatible with both the Model I and the Model III. Mod I compiled programs work on a MODEL III, and visa-versa. ZBASIC works with NEWDOS-80, NEWDOS+, DOSPLUS, LDOS, MULTIDOS, ULTRADOS, TRSDOS etc.
12. BUILT-IN and much improved MUSIC and SOUND EFFECTS commands.
13. Improved CHAINING for disk users.
14. TIME$ now available on DISK version.
15. ZBASIC 2.2 now has an INPUT @ command (similar to PRINT @).
16. The TAB function will now tab 255 columns on a printer. (BASIC cannot tab past column 64.)
17. NEWDOS 80 2.0 USERS can use the CMD " dos command" function!
18. NEW and EASIER to use USR COMMANDS.
19. New math functions to calculate XOR and INTEGER REMAINDERS.
20. Logical STRING COMPARISONS are now supported.
21. The disk commands INSTR, MID$ ASSIGNMENT are now supported on both DISK AND TAPE ZBASIC.
22. DEFSTR is now supported.
23. Eight disk files may be opened simultaneously, random, sequential or mixed.
24. LINE INPUT #, is now supported.
25. Invoke the compiler by simply hitting these two keys "!-"
26. NEW 100+ PAGE MANUAL WITH DESCRIPTIONS AND EXAMPLE.
27. ZBASIC 2.2 Comes with CMDFILE/CMD program from MISOSYS, to allow appending or merging compiled programs and machine language programs from tape or disk.

ZBASIC 2.2 DOES NOT SUPPORT THESE BASIC COMMANDS:

1. ATN, EXP, COS, SIN, LOG, TAN, and exponentiation. (However, subroutines are included in the manual for these functions.)
2. ERROR ON ERROR GOTO, LRL, ERR, RESUME.
3. No direct commands like AUTO, EDIT, LIST, LUST ETC. although these commands may be used when writing programs.
4. Others NOT supported: CDBL, CINT, CSNG, DEFFN, FIX, FRE.
5. Normal CASSETTE I/O. (ZBASIC supports it's own SPECIAL CASSETTE I/O statements.)
6. SOME BASIC COMMANDS MAY DIFFER IN ZBASIC. For instance, END jumps to DOS READY, STOP jumps to BASIC READY etc.
7. MEMORY REQUIREMENTS: to approximate the largest BASIC program that can be compiled in your machine (at one time), enter BASIC and type: PRINT (MEM-6500)/2. Remember, you can merge compiled programs together to fill memory.

ZBASIC 2.2 SPEED COMPARISON DEMO

To help give you an idea how fast compiled programs are, we have included this demo program:

ZBASIC 2.2 DEMO PROGRAM

Time to compile and run complete program	: 0 MIN. 2 SEC.
BASIC Execution speed MOD 1, LEVEL II	: 7 MIN. 34 SEC.
ZBASIC Execution speed MOD 1, LEVEL II	: 0 MIN. 10 SEC.
BASIC Program size (WITHOUT VARIABLES)	: 895 BYTES
ZBASIC Program size (WITHOUT VARIABLES)	: 2733 BYTES

(Remember that the ZBASIC program includes an 1879 byte subroutine package.) Program shown exactly as compiled and run in BASIC and ZBASIC.

```
10 '******** ZBASIC 2.0 EXAMPLE PROGRAM AND TIME TEST********
20 CLS:CLEAR100:DEFINT A-Z:DEFSTR Z:DIM AA(64,24),Z(50):RANDOM
30 AA=100:BB=-100:CC=3:DD=-3:EE=-9999:ST$="START TIME "+TIME$
40 FOR I=1TO127STEP2 :FOR J=47TO18STEP-3:XX=POINT(I,J):SET(I,J)
50 XX=(I-J)/CC+17+I+J :XX=ABS(INT(RND(I+J)-6A)+7) :RESET(I,J)
60 XX=PEEK(I+J) :POKE15360+I+J,J :OUT255,J AND (3+J):XX=INP(1)
70 AB$=ST$(I+J) :BC$=LEFT$(AB$,2) :AA(I/8,J/2)=VAL(BC$)+AA+3
80 BB$=BC$+RIGHT$(BB$,RND(3)) :XX=INSTR(1,BB$,"9"):XX=9AA+I+J
90 BA$=MID$(BB$,2,2) :MID$(BB$,1,1)=Z :IF XX THEN 100 ELSE CL8
100 IF LEN(BB$)>3 OR SGN(XX)=1 AND ASC(BA$)=32 THEN PRINT"***";
110 IFPOS(0)>62 THEN TRON:TROFF:PRINT ELSE X=NOT(RND*99):100
120 A$=INKEY$:IF A$="Y" OR A$="y" AND I>120 THEN PRINT"TRUE.."
130 RESTORE :READA,C,Z(J),D:GOSUB170:GOSUB170:GOSUB170:GOTO210
140 NEXT :PRINT"*"+TIME$:CLS:PRINT@512,ST$,"STOP TIME "+TIME$
150 STOP'*************** END OF MAIN TEST LOOP ***************
160 DATA 12345,-3,"TEST",-9999
170 ON RND(6) GOTO 180,190,200,180,190,200
180 RETURN
190 RETURN
200 RETURN
210 ON RND(9) GOSUB 180,190,200,180,190,200,180,190,200
220 GOTO140
```

NOTICE: ZBASIC 2.0 OWNERS: you can upgrade your ZBASIC 2.0 for no charge. Just send us your original diskette/cassette and a S.A.S.E. with your registered serial number and copy of your invoice. We will send you ZBASIC 2.2 and updates to your manual.

VISA, MASTERCARD, AMERICAN EXPRESS, C.O.D. ORDERS ONLY

800 528-1149 order line

ZBASIC 2.2 DISK VERSION AND MANUAL	89.95
ZBASIC 2.2 TAPE VERSION AND MANUAL	79.95
ZBASIC 2.2 DISK & TAPE VERSION AND MANUAL	99.99
MANUAL ONLY. (APPLIES TO PURCHASE)	25.00

SIMUTEK COMPUTER PRODUCTS INC.

TECHNICAL QUESTIONS PLEASE CALL (602) 323-9391
4897 E. SPEEDWAY, TUCSON, ARIZONA 85712 ↵12

TRS-80 is tm of Radio Shack, a Tandy Corp.

↵See List of Advertisers on page 338

GAME

LOAD 80

Put this one on the shelf next to Reversi.

The Game of Kalah

Jonathan D. Victor
445 E. 68th St.
New York, NY 10021

Kalah is an age old game of strategy for two players. This Assembly language program plays Kalah frustratingly well. By developing an intelligent Kalah program I now have a tough and tireless opponent. I hope this Kalah will inspire others to develop intelligent two-opponent games.

My first priority was to see how a rudimentary form of artificial intelligence could be realized within the confines of 16K. This influenced my choice of game. The game needs to be a head-to-head battle of wits between the computer and me. There should be no element of chance and no element of time. There should be no simple winning strategy, such as in tic-tac-toe, and yet the game has to have enough order to give a human player a sense of strategy. Furthermore, each player must have a finite, relatively small number of legal options for each move, so the program can examine each of them in detail. Lastly, the game must unavoidably end; the program cannot get stuck in an endless loop.

Any game with these reletively unrestrictive characteristics is a candidate for the same programming approach used in Kalah. I chose the game of Kalah, but games like Reversi (Othello), three-dimensional tic-tac-toe and many of the games described in Sackson's excellent *A Gamut of Games* (Castle Games, New York) or Gardner's Mathematical Games column of *Scientific American* are susceptible to this approach. However, an application of this method to a game as complex as checkers or chess is likely to be a very difficult task.

The Key Box

Model I
4K to run
16K to assemble

Rules of Kalah

Kalah is a two-player game played on a wooden board with hollowed-out pits, arranged as shown in Fig. 1. The game begins with an equal number of counters in each of the circular bins. The oval pits, called kalahs, begin empty. The standard game begins with six counters in each bin; I wrote the program to accommodate an initial number of counters ranging from three to nine.

The object of the game is for each player to accumulate as many counters in his kalah as possible. A move consists of a player choosing one of his bins, removing all of the counters from it, and distributing these counters in a counter-clockwise sequence, dropping one counter into each bin or kalah encountered. If the last counter falls into the player's own kalah, he gets a free move (see Figs. 2 and 3). The number of consecutive free moves is not restricted. If the counting-out process reaches the opponent's kalah, the opponent's kalah is skipped over and the next counter is added to the player's own bin 6.

A capture is made if the last counter is deposited in one of the player's own empty bins: this last counter and all of the counters in the opponent's bin opposite it are added to the player's own kalah. This terminates his move. If the opponent's opposite bin is empty, no capture is made and the last counter remains alone in the appropriate bin. Figures 4 and 5 illustrate the boards before and after player 2 makes a capture by moving from bin 1. A player with 13 counters in any of his bins can always make a capture because the last counter will fall into the same bin he started from.

The game ends when all of the bins on one player's side are empty (regardless of whose move it is). The player with counters remaining in his bins adds them to those in his kalah. The winner is the player with the greater number of counters in his kalah after this final maneuver.

In abstract terms, the board's configuration is limited by the number of counters in each of the twelve bins and two kalahs. Moves are described by a number in the range one to six to specify the selected bin. This simplicity greatly facilitates programming the game.

Choosing a Strategy

I attempted to design the program's strategy based, in a general way, on how I play Kalah. If one is confronted with a position where a single move will end the game immediately with a win, it is no problem to find the move and execute it. But this circumstance happens only rarely. It is also rare to be in a position where the game can be analyzed completely to the end. Knowing this, the human player can determine how advantageous a given position of the

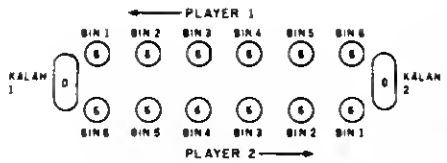


Fig. 1. Ready to play Kalah.

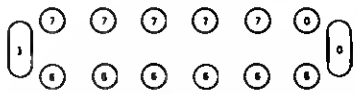


Fig. 2. Move originated from player 1's bin 6. The last counter fell into player 1's own kalah giving him a free move.

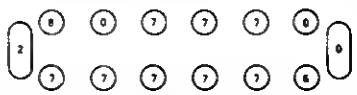


Fig. 3. Player 1's next move originated from bin 2 and finished in player 2's bin 2.

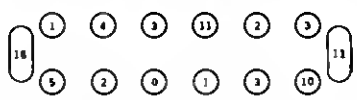


Fig. 4. Player 2 is about to capture by moving from bin 1.

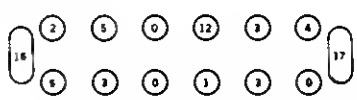


Fig. 5. Capture completed.

board is and choose his move to result in the best position according to this standard. Let us call this standard the *evaluation function*. The evaluation function is a way of translating a given position of the board into a number which expresses the relative advantage of player 1. Expressed in terms of the evaluation function, player 1's goal is to maximize the evaluation function and player 2's goal is to minimize it. At the end of the game, player 1 wins if the evaluation function is positive and player 2 wins if it is negetive.

Intuitively, one major determinant of the evaluation function should be the number of counters in each kalah. Towards the end of the game, the total number of counters in each player's bins becomes significant, since these bins are combined with the kalah at the end of the game for total points. A combination of these two quantities, with the second quantity weighted by how close the end of the game is, forms a good evaluation function. I chose the evaluation function by playing various candidates against each other.

A second strategy ingredient interacts with the evaluation function: the depth to which future moves are anelyzed. Assume the program is player 1 and is, then, attempting to maximize the evaluation function. The simplest way to pursue this goal is to calculate the evaluation function for each position and choose the move which gives the maximum value. (For the moment, the complication of free moves is neglected.) This *depth-of-one* strategy will certainly notice moves with immediate advantages, such as an opportunity to capture, but unless the evaluation function is extremely clever, this strategy will show little foresight. For example, it will probably not defend itself against captures set up by the opponent.

The next layer of complexity fixes this problem. To evaluate a potentiel move, player 1 assumes that player 2 will reply by using the depth-of-one strategy from player 2's point of view; that is, player 2 will attempt to minimize the evaluation function. Player 1 will choose a move giving him the maximum evaluation function after player 2 replies with a move to minimize it. This can be called the *depth-of-two* strategy or the minimax rule.

It does not take much imagination to extend this process to arbitrary depths. The *depth-of-n* strategy for player 1 consists of choosing the move which maximizes the evaluation function *n* moves in the future, assuming player 2 will respond with a *depth-of-(n – 1)* strategy. If player 1 uses a *depth-of-3* strategy, he may be able to select a move that will set himself up to make a capture no matter what player 2's reply is to his original move. If player 1 uses a *depth-of-four* strategy, he will be capable of selecting a move to avoid getting trapped as was player 2 in the previous example.

If the end of the game is reached within the depth analyzed, the depth-of-n strategy will play a perfect game. However, the amount of calculations necessary for the depth-of-n strategy increases exponentially with n. The rapidity of this increase is determined by the branching number, the number of possible moves a player has in a typical game position. In the case of Kalah, the branching number is six (again neglecting the complication of free turns). A practical limit for the depth of analysis is approximately four for machine-language programs or two for Basic programs making the minimax rule and its extensions only usable for reasonably short-range planning, and the evaluation function must try to take account of the global situation.

If (as is usuelly the case) the depth of examination is not sufficient to see a game through to the end, the present kind of strategy need not select the ideal move—disaster may lurk just over the horizon. This may be exploited by the opponent, perhaps not even intentionally. It is possible that a depth-of-two strategy may beat a depth-of-four strategy. One cannot assume that increasing the level of analysis makes a superior strategy. Odd-depth strategies can be characterized as offensive and even-depth strategies as defensive. Knowing this may be as important as the level of analysis. These quirks do not arise in Kalah, but I mention them to caution those who may attempt to apply this general method to other games.

OMNITEK COMPUTERS ↙195
INTERNATIONAL, INC.
1300 MAIN STREET
TEWKSBURY, MASS
617-851-4580

RS232 Direct Connect Modems	99.00
Scotch S/S/D 5.25" Diskettes	25.00
Verbatim 5.25" D. L.	25.00
16K RAM KITS	14.00
TECO 12" B&G Monitor	119.00
Okidata Microline 80	329.00
Okidata Microline 82A	449.00
Okidata Microline 83A	699.00
Epson Mx-80	479.00
Epson MX-80 FT	569.00
Radio Shack MIII w/48K	879.00
Radio Shack MIII w/48K and 2 40T dr 1699.00 ... and RS232	1799.00
40 track 5.25" Tandon TM-100-1	284.00
80 track 5.25" Tandon Dual Head	484.00
5.25" Power Supply and case	49.00
8" Power Supply and case	99.00
CENTRONICS 739 Printer	499.00

TRS-80 is a registered trademark of Tandy Corp

Prices are for mail order only.
TERMS: Check, money order, Mastercard and Visa accepted. F.O.B. Tewksbury-freight extra. Mass residents add 5% sales tax. Write for FREE CATALOG

MODEM-80
(Reviewed in June/July '82 Issue)
Now available for TRS-80* I & III
APPLE** and PET***

FEATURES

Direct Connect & Auto Dial/Answer
No RS232 Interface Required
Full-function TERMINAL software included which works with most BB & time-sharing systems.
Unique program/data transfer software included allowing TRS-80s and APPLEs to talk to each other with auto line error detect and retransmit.

Price: U.S. $289 ($359 CDN)
TRS-80 Cable Extra

DEALERS: INQUIRIES WELCOME
For dealer nearest you, write **ICROM Enterprises Ltd., Milliken**, PO Box 218, Milliken, Ontario, Canada L0H 1K0 or phone 416-293-1344.
Western Canadians contact Rainbow Software Services, 7070B Farrell Rd SE, Calgary, Alberta T2H 0T2 or phone 403-253-6142.

* **Tandy Corp Trademark**
** **APPLE Computers Inc Trademark** ↙54
*** **Commodore International Trademark**

↙See List of Advertisers on page 338

Scanned by Ira Goldklang - www.trs-80.com

To sum up: choice of an evaluation function and a depth of analysis determines a strategy; analysis of the game may suggest a rudimentary evaluation function; and comparison of two evaluation functions and choice of a depth of analysis must be done experimentally by playing prospective strategies against each other.

Programming Strategy vs Strategy

I used Program Listing 1 to test one strategy against another. This program assumes player 1 uses a predetermined evaluation function A and that player 2 uses a second evaluation function B; both evaluation functions are an integral part of the source code and must be specified before assembly. The depth of analysis used by each player can be modified at run time. The generated strategies are pitted against each other for up to 255 games. The program keeps track of the total number of games and counters won by each player.

The opening dialog begins at Start. It asks for depth of analysis to be used by each internal "player;" these are stored in location IQ for player 1 and in location IQ + 1 for player 2. The number of counters to be placed in each bin is kept in INICTR. The number of games to be played is kept in NGAMES.

The program's strategy will always yield an unambiguous choice, except in the rare instance of two potential moves leading to the same extreme value of the evaluation function. Playing one strategy against an-

Program Listing 1

```
                00000 ;AUTO-KALAH VERSION 3 ... J. D. VICTOR
42E9            00001         ORG     42E9H
42E9 ED7BA048   00002 START   LD      SP,(48A8H)
42ED CDC901     00003         CALL    1C9H
42F0 21A346     00004         LD      HL,M61
42F3 CDA728     00005         CALL    28A7H
42F6 219D46     00006         LD      HL,SCORE
42F9 010006     00007         LD      BC,600H
42FC CD2F46     00008         CALL    MVBCHL
42FF 21CB46     00009         LD      HL,MS4A
4302 CD6846     00010         CALL    GTINT
4305 7B         00011         LD      A,E
4306 329846     00012         LD      (IQ),A
4309 21D146     00013         LD      HL,MS4B
430C CD6846     00014         CALL    GTINT
430F 7B         00015         LD      A,E
4310 329946     00016         LD      (IQ+1),A
4313 21D746     00017         LD      HL,MS5
4316 CD6846     00018         CALL    GTINT
4319 7B         00019         LD      A,E
431A 329C46     00020         LD      (INICTR),A
431D 21BB46     00021         LD      HL,MS3
4320 CD6846     00022         CALL    GTINT
4323 7B         00023         LD      A,E
4324 329A46     00024         LD      (NGAMES),A
4327 AF         00025         XOR     A
4328 329B46     00026         LD      (NGAME),A
                00027 ;SET UP STARTING POSITION
432B 3A9B46     00028 GAME    LD      A,(NGAME)
432E CB47       00029         BIT     0,A
4330 204D       00030         JR      NZ,GA1
4332 CB4F       00031         BIT     1,A
4334 2038       00032         JR      NZ,GA2
4336 3A9C46     00033         LD      A,(INICTR)
4339 4F         00034         LD      C,A
433A 0606       00035         LD      B,6
433C 217246     00036         LD      HL,STPOS
433F AF         00037         XOR     A
4340 77         00038         LD      (HL),A
4341 23         00039         INC     HL
4342 CD2F46     00040         CALL    MVBCHL
4345 77         00041         LD      (HL),A
4346 23         00042         INC     HL
4347 CD2F46     00043         CALL    MVBCHL
434A 010206     00044         LD      BC,602H
434D 117246     00045         LD      DE,STPOS
4350 C5         00046 GA4     PUSH    BC
4351 D5         00047         PUSH    DE
4352 210600     00048         LD      HL,6
4355 CD5B46     00049         CALL    RNDM
4358 D1         00050         POP     DE
4359 19         00051         ADD     HL,DE
435A C1         00052         POP     BC
435B CB40       00053         BIT     0,B
435D 2002       00054         JR      NZ,GA5
435F 34         00055         INC     (HL)
4360 34         00056         INC     (HL)
4361 35         00057 GA5     DEC     (HL)
4362 10EC       00058         DJNZ    GA4
4364 0D         00059         DEC     C
4365 2018       00060         JR      Z,GA1
4367 0606       00061         LD      B,6
4369 117946     00062         LD      DE,STPOS+7
436C 18E2       00063         JR      GA4
436E 217346     00064 GA2     LD      HL,STPOS+1
4371 117A46     00065         LD      DE,STPOS+8
4374 0606       00066         LD      B,6
4376 1A         00067 GA3     LD      A,(DE)
4377 4E         00068         LD      C,(HL)
4378 77         00069         LD      (HL),A
4379 79         00070         LD      A,C
437A 12         00071         LD      (DE),A
437B 23         00072         INC     HL
437C 13         00073         INC     DE
437D 10F7       00074         DJNZ    GA3
437F 217246     00075 GA1     LD      HL,STPOS
4382 112847     00076         LD      DE,BOARDS+1
4385 010600     00077         LD      BC,6EH
4388 EDB0       00078         LDIR
438A 3A9B46     00079         LD      A,(NGAME)
438D E601       00080         AND     1
438F 3D         00081         DEC     A
4390 322747     00082         LD      (BOARDS),A
                00083 ;START PLAYING
4393 3E0D       00084         LD      A,0DH
4395 CD33AH     00085         CALL    033AH
4398 DD212847   00086 POSIT   LD      IX,BOARDS+1
439C CD2C45     00087         CALL    GAMOVR
439F CA4645     00088         JP      Z,ENDGAM
43A2 DD212847   00089         LD      IX,BOARDS+1
43A6 DD7EFF     00090         LD      A,(IX+0FFH)
43A9 219846     00091         LD      HL,IQ
43AC B7         00092         OR      A
43AD 2001       00093         JR      Z,TR1
43AF 23         00094         INC     HL
43B0 46         00095 TR1     LD      B,(HL)
43B1 CDD443     00096         CALL    BSTMOV
43B4 69         00097         LD      L,C
43B5 2D         00098         DEC     L
43B6 7D         00099         LD      A,L
43B7 C631       00100         ADD     A,'1'
43B9 CD3A03     00101         CALL    33AH
43BC DD212847   00102         LD      IX,BOARD6+1
43C0 DD66FF     00103         LD      H,(IX+0FFH)
43C3 CD9A44     00104         CALL    KALMOV
43C6 FE02       00105         CP      2
43C8 28CE       00106         JR      Z,PO6IT
43CA 3A2747     00107         LD      A,(BOARD6)
43CD 2F         00108         CPL
43CE 322747     00109         LD      (BOARDS),A
43D1 C39843     00110         JP      POSIT
                00111 ;ENTRY: IX->ACTIVE BOARD,A=TURN,B=IQ
                00112 ;EXIT: C=BIN 0(1-6),HL=EVAL
43D4 F5         00113 BSTMOV  PUSH    AF
43D5 0E00       00114         LD      C,0
43D7 CD2C45     00115         CALL    GAMOVR
43DA 2002       00116         JR      NZ,BS0
43DC F1         00117         POP     AF
43DD C9         00118         RET
43DE C5         00119 BS0     PUSH    BC
43DF D5         00120         PUSH    DE
43E0 E5         00121         PUSH    HL
43E1 DDE5       00122         PUSH    IX
43E3 FDE5       00123         PUSH    IY
43E5 210000     00124         LD      HL,0
43E8 39         00125         ADD     HL,SP
43E9 E5         00126         PUSH    HL
43EA FDE1       00127         POP     IY
43EC 3E06       00128         LD      A,6
43EE FD6E02     00129 BS1     LD      L,(IY+2)
43F1 FD6603     00130         LD      H,(IY+3)
43F4 2B         00131         DEC     HL
43F5 5D         00132         LD      E,L
43F6 54         00133         LD      D,H
43F7 010F00     00134         LD      BC,0FH
43FA 09         00135         ADD     HL,BC
43FB EB         00136         EX      DE,HL
43FC EDB0       00137         LDIR
43FE 23         00138         INC     HL
43FF E5         00139         PUSH    HL
4400 DDE1       00140         POP     IX
4402 6F         00141         LD      L,A
4403 2D         00142         DEC     L
4404 DD66FF     00143         LD      H,(IX+0FFH)
4407 08         00144         EX      AF,AF'
4408 CD9A44     00145         CALL    KALMOV
440B FD4609     00146         LD      B,(IY+9)
440E CB4F       00147         BIT     1,A
4410 2810       00148         JR      Z,BS3
4412 0F         00149         RRCA
4413 381C       00150         JR      NC,BS2
4415 08         00151 BS4     EX      AF,AF'
4416 3D         00152         DEC     A
4417 20D5       00153         JR      NZ,BS1
4419 FDE1       00154         POP     IY
441B DDE1       00155         POP     IX
441D E1         00156         POP     HL
```

Listing 1 continues

More powerful programming tools for the TRS-80.™ Now on disk.

Better results. Microsoft's Level III BASIC and Editor/Assembler-Plus are programming tools that help you write complex programs in less time, with less effort and utilizing less memory. Better programs. No matter what your programming skill. And for the first time these tools are available on disk.

Editor/Assembler-Plus. A powerful editing, assembly and debugging tool with many sophisticated features that make writing TRS-80 assembly language programs easier, faster and more efficient.

- Full disk capabilities.
- Assembly directly into memory. No need to save object code then reload for execution.
- Macro capability that allows you to define macros for commonly used sequences of instructions.
- Conditional assembly that allows you to generate more than one version of a program.
- Eight breakpoints at a time for program debugging.
- The INCLUDE statement that allows you to call additional disk files for assembly.
- Other features include extensive operators, automatic origin, symbol table printout, quash command, hex, decimal and octal constants, single step-through instructions in memory, five type-out modes, four type-in radices, plus extensive edit commands.

A more powerful BASIC. With Level III BASIC, you get power to perform tasks in BASIC that used to require assembly language. Plus, new ease-of-use features for your TRS-80.

- Advanced graphics. Develop charts, graphs, even animation in Level III BASIC. Draw a line, an outline box or a solid box by specifying just two points. Then save and recall it with BASIC commands.
- MENU. One command that allows you to construct an entire menu.
- CHAIN and COMMON commands allow you to call another program and pass variables to it.
- Powerful editing commands such as COPY/TRANSFER, FIND and CHANGE.
- DUMP command that makes debugging easier.
- Time-limit response. New INPUT # LEN and LINE INPUT # LEN commands allow you to set a time limit on response.
- RS-232 output from BASIC. With a single command.
- More. Level III gives you automatic line numbering, 26 user-definable single stroke instructions, and more.

Disk or cassette. Disk versions of Level III and Editor/Assembler-Plus are brand new. Cassette versions are also available with many of the same capabilities.

Talk to your Microsoft™ dealer. Ask for a demonstration of two of the most powerful tools you can get for your TRS-80: Level III BASIC and Editor/Assembler-Plus. On disk or cassette. From Microsoft.

TRS-80 is a trademark of Radio Shack, a division of Tandy Corporation
Microsoft is a trademark of Microsoft, Inc
Microsoft Consumer Products is a division of Microsoft, Inc

✓ 282

MICROSOFT
CONSUMER PRODUCTS

10700 Northup Way, Bellevue, WA 98004. (206) 828-8080

See List of Advertisers on page 338

Listing 1 continued

```
441E E1        00157          POP     HL
441F C1        00158          POP     BC
4420 F1        00159          POP     AF
4421 C9        00160          RET
4422 05        00161 BS3      DEC     B
4423 2005      00162          JR      NZ,BS5
4425 CD5E44    00163          CALL    EVAL
4428 18BC      00164          JR      BS6
442A DD7EFF    00165 BS5      LD      A,(IX+0FFH)
442D 2F        00166          CPL
442E DD77FF    00167          LD      (IX+0FFH),A
4431 08        00168 BS2      EX      AF,AF'
4432 CDD443    00169          CALL    BSTMOV
4435 08        00170          EX      AF,AF'
4436 FD7E00    00171 BS6      LD      A,(IY+0)
4439 B7        00172          OR      A
443A 2815      00173          JR      Z,UPDATE
443C FD5E06    00174          LD      E,(IY+6)
443F FD5607    00175          LD      D,(IY+7)
4442 B7        00176          OR      A
4443 ED52      00177          SBC     HL,DE
4445 28CE      00178          JR      Z,BS4
4447 DD7EF8    00179          LD      A,(IX+0F8H)
444A 3001      00180          JR      C,BS7
444C 2F        00181          CPL
444D 0F        00182 BS7      RRCA
444E 30C5      00183          JR      NC,BS4
4450 19        00184          ADD     HL,DE
4451 08        00185 UPDATE   EX      AF,AF'
4452 FD7700    00186          LD      (IY+0),A
4455 08        00187          EX      AF,AF'
4456 FD7506    00188          LD      (IY+6),L
4459 FD7407    00189          LD      (IY+7),H
445C 10B7      00190          JR      BS4
               00191 ;ENTRY: IX->ACTIVE BOARD; EXIT: HL=EVAL
445E D9        00192 EVAL     EXX
445F AF        00193          XOR     A
4460 67        00194          LD      H,A
4461 57        00195          LD      D,A
4462 47        00196          LD      B,A
4463 DD6E00    00197          LD      L,(IX+0)
4466 DD5E07    00198          LD      E,(IX+7)
4469 ED52      00199          SBC     HL,DE
446B CD2C45    00200          CALL    GAMOVR
446E 2822      00201          JR      NZ,EV1
4470 DDE5      00202          PUSH    IX
4472 0606      00203          LD      B,6
4474 DD23      00204 EV2      INC     IX
4476 DD5E00    00205          LD      E,(IX+0)
4479 19        00206          ADD     HL,DE
447A DD5E07    00207          LD      E,(IX+7)
447D B7        00208          OR      A
447E ED52      00209          SBC     HL,DE
4480 10F2      00210          DJNZ    EV2
4482 DDE1      00211          POP     IX
4484 3A2747    00212          LD      A,(BOARDS)      ;FOR DIFFERENT
4487 B7        00213          OR      A               ;STRATEGIES
4488 2808      00214          JR      Z,EV1           ;INCLUDE THESE
448A 7C        00215          LD      A,H
448B B5        00216          OR      L
448C 2804      00217          JR      Z,EV1
448E 7C        00218          LD      A,H
448F EE40      00219          XOR     40H
4491 67        00220          LD      H,A
4492 E5        00221 EV1      PUSH    HL
4493 D9        00222          EXX
4494 E1        00223          POP     HL
4495 7C        00224          LD      A,H
4496 EE80      00225          XOR     80H
4498 67        00226          LD      H,A
4499 C9        00227          RET
               00228 ;ENTRY: IX->ACTIVE BOARD,L=BIN 4(0-5),H=TURN(0,-1)
               00229 ;EXIT: A=-1 FOR EMPTY BIN,1 FOR CAPTURE,2 FOR FREE MOVE
449A C5        00230 KALMOV   PUSH    BC
449B D5        00231          PUSH    DE
449C DDE5      00232          PUSH    IX
449E 010700    00233          LD      BC,7
44A1 59        00234          LD      D,C
44A2 5D        00235          LD      E,L
44A3 1C        00236          INC     E
44A4 7C        00237          LD      A,H
44A5 B7        00238          OR      A
44A6 2803      00239          JR      Z,KM0
44A8 79        00240          LD      A,C
44A9 83        00241          ADD     A,E
44AA 5F        00242          LD      E,A
44AB DD19      00243 KM0      ADD     IX,DE
44AD DD7E00    00244          LD      A,(IX+0)
44B0 B7        00245          OR      A
44B1 2006      00246          JR      NZ,KM1
44B3 3D        00247          DEC     A
44B4 DDE1      00248 KM2      POP     IX
44B6 D1        00249 KM3      POP     DE
44B7 C1        00250          POP     BC
44B8 C9        00251          RET
44B9 DD360000  00252 KM1      LD      (IX+0),0
44BD 57        00253          LD      D,A
44BE DD2B      00254 KL       DEC     IX
```

Listing 1 continues

other will reproduce the same game, over and over, unless specific preventive measures are taken. To form a realistic sense of the relative merits of two strategies, I chose to pit them against each other using a variety of random starting positions. This is done by the next section of the code.

The 14 locations, beginning at STPOS, represent the contents of player 1's kalah, player 1's bins, player 2's kalah and player 2's bins (in that order) at the start of the game. The kalahs are initialized to zero and the bins to INICTR. Before the game is played, single counters are added to two bins of each player at random, and single counters are subtracted from two (not necessarily distinct) bins at random. This provides a wide variety of starting positions with the same total number of counters on each player's side, all close to the standard starting position. However, this process may by chance give one player a more advantageous starting position in the games sampled. This is corrected by exchanging starting positions after the game is played. Possible random variations are further balanced by allowing each player the opportunity to have the first move for each starting configuration. After four games based on a single random STPOS, a new random configuration is chosen.

The locations, beginning with Boards, hold the current state of the board at any given time during the evolution of the game. The format consists of 15 locations, with the initial byte indicating whose turn it is (zero for player 1; minus one for player 2), and the 14 subsequent locations holding the contents of the kalahs and bins, formatted as in STPOS. Just before the game begins, the contents of STPOS are transferred to the 14 locations beginning at Boards + 1, and Boards is loaded with the appropriate byte. Boards is the last location of the program. This is crucial, because an indefinite number of blocks of 15 bytes following the initial block will be used to hold the configuration of the board during analysis of the tree of hypothetical moves.

The loop beginning at POSIT is the playing of the game itself. First the routine GAMOVR is executed. This determines if the end of the game has been reached. If so, control passes to ENDGAM to determine the winner, tally the cumulative number of games and counters won by each player and begin the next game if the total number of games requested have not yet been played. Assuming the end of the game has not been reached, preparations are made to calculate the next move according to the strategy appropriate for the player whose turn it is: register IX is loaded with Boards + 1 (pointing to kalah 1 of the current board), register A indicates the player whose turn it is and register B contains the requested depth of analysis.

BSTMOV is the routine for calculating the best move for a given evaluation function and depth of analysis. Most importantly this subroutine is recursive—it can be called by itself. This is ideally suited for strategies looking many moves ahead.

THE ULTIMATE IN COLORCOMPUTING

WORD PROCESSING

THE SUPER "COLOR" WRITER II

The Word Processor that re-writes the book on Word Processing

The **Super "Color" Writer** is a FAST machine code full featured printer/screen (smooth scrolling) word processing system for the TRS-80™ Color Computer and DMP printer. The video display is 64 characters per line by 24 lines (plus cursor line) and is displayed in both upper and lower case with true descenders. The cursor control WINDOWS have you free to edit anywhere in the text file at any time. It will fit right in with the rest of the keyboard writer with FULL BASIC type system and is easy to learn, easy to use.

COMPARISON CHART	SUPER COLOR WRITER II			THE COMPETITION		
System Size	4K	16K	32K	4K	16K	32K
TAPE Text Files	No	8K	21K	No	2K	11K
DISK Text Files	99K	156K	231K	No	0K	0K
DISK Text Space	91K	150K	223K	No	0K	0K
Right Justify		YES			NO	
Word Wrap		YES			NO	
Editing Facilities		YES			NO	

The figures speak for themselves and with purchase not features like the GoMMaR-LE function in string commands (part of the 32 commands automatically in GoMMaR-LE text for changing the GoMMaR-LE column insert & delete, and right hand JUSTIFICATION with unbeatable flexibility the choice is one of many spell more).

The **Super "Color" Writer** has full advantage of the new read format printers with Control codes 1-31 & 127 programmable control codes 128-255 for special needs of Epson, Gemini, Okidata 737, 738, 82A, Star SG-10, Line Printer VII, VIII, Prism.

CHECK THESE FEATURES!!

HIGH SPEED machine code • 32K Compatible • Windows • Key-key • HELP key (2 pages) • 80 column graphics • Multi-Line • Lowercase • Editing commands • Quick page • Search • Word wrap • Tabs • Insert or type over • Auto Screen Backup • Delete • Margin • Page length • Printer Control Commands • Word count • Backspace • Numbers • Numbers Files (Duplicate) • Auto Page Numbering • Centering • Underline • Boldface • Flash Print • Non-stop printing • Command mode • Super Search • Find & Change • Full Page Format • Set Tab • Clear Tab • Clear All Tabs • Margins • Page Numbers • Title Page • Control Print (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12) • Lowercase after Cursor • Full Print Formatter • Works With Most Printers • 80 Page

SUPER "COLOR" WRITER DISK

The disk version of the **Super "Color" Writer** works with the TRS-80 Disk System and has all the features listed above, but only in Disk Mode. In Disk Mode there is also HELP (Many pages of help files) and FREE DOS. You can load or SAVE any text file you've stored with the **Super "Color" Writer** and merge it with the **Super "Color" Terminal** file ASCII files. The **Super "Color" Writer Disk** adds a new dimension to printing out your letters. It has all the features of the tape version and also allows you to use the full capacity of your disk drive with over 1 million characters.

Includes 80 column software, printer & manual

TAPE $49.95 **ROM PAK $74.95** **DISK $39.95**

Manual only $7.95 (refundable with purchase)

COMMUNICATIONS

THE SUPER "COLOR" TERMINAL

Time Share, Smart Terminal, High-speed Data Xfer & Videotex

The **Super "Color" Terminal** turns the Color Computer into a Super Smart terminal with all the features of MICROTERM™ plus much more. COMMUNICATE with other Color Computers or with computers like the TRS-80™ MODELS I, III, APPLE etc. with 300 or RS-232 baud. Save the data to tape or print it out. Use N-LINE to dial a minimum

FEATURES

Buffer size settings 9K or 23K • Buffer full or not full • Upload buffer contents • Full 128 ASCII key input • Combine with **Super "Color" Writer** files • Up to 255 WNL or ASCII files • Multiple Language • Basic programs • Set RS-232 parameters • Duplex: Half/Full • Input rates: 110, 300, 1200, 2400 Baud • Word Lengths 5, 6, 7, 8 • Parity: Even or None • Stop bits: 1 or 2 • Line Length set by screen • Tape save/load ASCII files • Machine code program • Utilize all of 64K for copying files

Super "Color" Terminal Disk

This disk version offers all the features listed above, but in addition offers the following • Disk Directory • Kill, Rename, Run, Load, Save, Merge, Append ASCII files • Load machine code programs • Utilize all of 64K for copying files

TAPE $39.95 **ROM PAK $49.95** **DISK $69.95**

Manual only $7.95 (refundable with purchase)

ROM PAK KITS

Put your programs in ROM PAK. Includes two board programs for 8K, 16K or 32K. Accepts 2K, 4K, 8K, 16K, 32K EPROMS. Supports 2716 Erase, 2732, 2764, 27128 EPROMS. 2K Static RAM. Instructions for using 8 different EPROMS.

27 **2K 5v EPROM $5.95 ea.** **2K Static RAM $10.95 ea.**

COLOR GAMES!!

FEATURING GREAT GRAPHICS & SOUND!

ADVENTURE 3-PAK Includes 16K Extended Basic **TAPE $24.95**

This THRILLING ADVENTURE GAMES takes you to the **WORLD UNDER THE CIMEEN MOON**. Explore the mysterious world with 1 computer controlled Monsters and quests, earn points, rank with 1 to 9 experience. Then explore through **CAZMAR'S UNDERWORLD OF DOOM** to find the four rooms & Castle of Doom. Search for the Evil Wizard while avoiding the Schizoid Trolls. Survive must then help find the Land of Oaks. The Quest Mountains to the **FROSAKEN GULTCH** where the wizard lives awaits you!

VEGAS 5-PAK Includes 16K Extended Basic **TAPE $19.95**

The THRILLS OF A VEGAS CASINO. Choose Five Popular Las Vegas games for 1 to 4 players **CASINO CRAPS 21 ONE ARMED BANDIT 5 UP & DOWN THE RIVER KENO**. Bank limits player's within 5 from game to game • Fantastic Graphics • Realistic Odds • Sounds • Authentic Casino • Heavy graphics • Short rules to each game

COMBAT 3-PAK Includes 16K Extended Basic **TAPE $24.95**

Three action packed two player games featuring blasting, strategy and real sound. LASER FIRE CANNONS MACHINE GUNS TANKS ETC.

2-in-1 TANK COMBAT has features • the opponents tanks are subject to rough terrain • sounds. **STELLAR BATTLE** or 1-5 Five Way Fighter Fleet against the speeds of enemy ships taking all with Five Types Fighters including the Imperial Star Fleet. **GALACTIC ALLIANCE** maneuver your command ship against enemy ships, planet bases, comets, space stations and more!

VISA MasterCard

DEALER INQUIRES ARE INVITED.

TRS-80 is a registered trademark of the Tandy Corp.

NELSON SOFTWARE SYSTEMS

P.O. Box 12756 Minneapolis, MN 55412 (612) 537-4763

Electronic Circuit Analysis

- Detailed analog circuit analysis
- DC and AC analysis
- Very fast, machine language
- Infinite circuits on multiple passes
- Worst case analysis
- Dynamic modification
- 64 Nodes
- Compare circuits
- Log or linear sweep
- Full file handling
- Frequency response, magnitude and phase
- Complete manual with examples
- A truly professional program with features previously available only on large systems
- Available soon for CP/M
- Available now for TRS-80 disk $75.00

Tatum Labs
P.O. Box 722
Hawleyville, CT 06440
(203) 426-2184

Dos helper

- The features your dos doesn't have
- Fast ram spooler
- Type ahead
- Route to disk
- Compare files
- File format conversions
  - Add and drop line numbers
  - Word processor to EDTASM
  - Unpack Basic programs
- Append object files
- Model III TRSDOS directory
- Neat listing of packed Basic programs
- Designed for Newdos80. Works with any dos
- Only $19.95
- TRS-80 Model I or Model III disk

TRS-80 is a trademark of Tandy Corp

263

Listing 1 continued

```
44C0 1D        00255          DEC     E
44C1 2012      00256          JR      NZ,NX1
44C3 79        00257          LD      A,C
44C4 87        00258          ADD     A,A
44C5 5F        00259          LD      E,A
44C6 DD09      00260          ADD     IX,BC
44C8 DD09      00261          ADD     IX,BC
44CA 14        00262          INC     D
44CB 7C        00263          LD      A,H
44CC B7        00264          OR      A
44CD 2013      00265          JR      NZ,DIDT
44CF 15        00266          DEC     D
44D0 DD34F2    00267          INC     (IX+0F2H)
44D3 100D      00268          JR      DIDT
44D5 7B        00269 NK1      LD      A,E
44D6 91        00270          SUB     C
44D7 2006      00271          JR      NZ,NK2
44D9 14        00272          INC     D
44DA 7C        00273          LD      A,H
44DB B7        00274          OR      A
44DC 2004      00275          JR      Z,DIDT
44DE 15        00276          DEC     D
44DF DD3400    00277 NK2      INC     (IX+0)
44E2 15        00278 DIDT     DEC     D
44E3 20D9      00279          JR      NZ,KL
44E5 7B        00280          LD      A,E
44E6 91        00281          SUB     C
44E7 2004      00282          JR      NZ,NEK2
44E9 3E02      00283 PT       LD      A,2
44EB 18C7      00284          JR      KM2
44ED 91        00285 NEK2     SUB     C
44EE 28F9      00286          JR      Z,PT
44F0 81        00287          ADD     A,C
44F1 AC        00288          XDR     H
44F2 17        00289          RLA
44F3 3003      00290          JR      C,OWNSID
44F5 AF        00291 KM4      XOR     A
44F6 18BC      00292          JR      KM2
44F8 DD7E00    00293 OWNSID   LD      A,(IX+0)
44FB 3D        00294          DEC     A
44FC 20F7      00295          JR      NZ,KM4
44FE FDE3      00296          EX      (SP),IY
4500 FDE5      00297          PUSB    IY
4502 79        00298          LD      A,C
4503 87        00299          ADD     A,A
4504 93        00300          SUB     E
4505 5F        00301          LD      E,A
4506 FD19      00302          ADD     IY,DE
4508 D1        00303          POP     DE
4509 D5        00304          PUSH    DE
450A FD7E00    00305          LD      A,(IY+0)
450D B7        00306          OR      A
450E 2816      00307          JR      Z,NOCAP
4510 DD360000  00308          LD      (IX+0),0
4514 FD360000  00309          LD      (IY+0),0
4518 3C        00310          INC     A
4519 F5        00311          PUSH    AF
451A 7C        00312          LD      A,H
451B B7        00313          OR      A
451C EB        00314          EX      DE,HL
451D 2001      00315          JR      Z,CAP1
451F 09        00316          ADD     HL,BC
4520 F1        00317 CAP1     POP     AF
4521 86        00318          ADD     A,(HL)
4522 EB        00319          EX      DE,HL
4523 12        00320          LD      (DE),A
4524 3E01      00321          LD      A,1
4526 DDE1      00322 NOCAP    POP     IX
4528 FDE1      00323          POP     IY
452A 180A      00324          JR      KM3
               00325 ;ENTRY:  IX->ACTIVE BOARD; EXIT: Z=1 FOR END OF GAME
452C C5        00326 GAMOVR   PUSH    BC
452D E5        00327          PUSH    HL
452E 01FF06    00328          LD      BC,06FFH
4531 DDE5      00329          PUSH    IX
4533 E1        00330          POP     HL
4534 AF        00331 GV1      XOR     A
4535 23        00332 GV2      INC     HL
4536 86        00333          ADD     A,(HL)
4537 10FC      00334          DJNZ    GV2
4539 2003      00335          JR      NZ,GV3
453B E1        00336 GV4      POP     HL
453C C1        00337          POP     BC
453D C9        00338          RET
453E 23        00339 GV3      INC     HL
453F 0606      00340          LD      B,6
4541 0C        00341          INC     C
4542 20F7      00342          JR      NZ,GV4
4544 18EE      00343          JR      GV1
4546 CDC901    00344 ENDGAM   CALL    01C9H
4549 212047    00345          LD      HL,BOARDS+1
454C CD0B46    00346          CALL    EGAD
454F 57        00347          LD      D,A
4550 CD0B46    00348          CALL    EGAD
4553 5F        00349          LD      E,A
4554 D5        00350          PUSH    DE
4555 BA        00351          CP      D
4556 21FF46    00352          LD      HL,MS0
```

Listing 1 continues

Player 1's move is calculated by maximizing the evaluation function n moves ahead assuming player 2's move minimizes the evaluation function by using a depth-of-(n-1) strategy. Then the depth-of-n routine needs to call a depth-of-(n-1) routine from its opponent's point of view, the depth-of-(n-1) routine needs to call a depth-of-(n-2) routine, and so on. The descending chain stops at a depth-of-1 strategy when the evaluation function, resulting from a hypothetical series of n turns and replies, must be calculated.

The inputs to BSTMOV are as set up by POSIT: IX points to kalah 1, A indicates whose turn it is and B indicates the depth of analysis. IX-1 points to a location indicating whose turn it is. On return, register C contains the selected move (indicated by a number in the range one to six) and HL contains the evaluation function of the deepest hypothetical move resulting from this chosen line of play. If the game is over, register C contains a zero.

The initial step in BSTMOV determines if the game is over. GAMOVR is called with IX pointing to kalah 1; on return the flag Z is set if the game is over. In this case BSTMOV is exited with register C loaded with zero and HL unchanged. The initial call from POSIT to BSTMOV only takes place if the game is not over; this endgame case only occurs in recursive calls to BSTMOV.

If the game is not over, all registers are saved on the stack and IY is loaded with the stack pointer. This way the saved values are accessible by indexing with respect to IY. In addition to saving the registers so recursive calls to BSTMOV will not destroy data, the current board position (or on recursive calls, the board position after some hypothetical moves) must be preserved. This is done by copying the 15 bytes holding the turn indicator and the board configuration into the next available 15 bytes after Boards, and incrementing IX by 15 so it points to the new kalah 1. This area is used to try out the six possible moves. The moves are enumerated by register A, which is initially loaded with six and is decremented on each pass until all possible moves are tried.

The first step in testing a hypothetical move is to calculate its effect on the board. This is done by the subroutine KALMOV. On entry to KALMOV, register L contains the number of the bin to be moved (in the range zero to five), register H indicates whose turn it is and IX points to the current kalah 1. On return, the register IX is unchanged but the contents of the kalahs and bins are appropriately modified. Register A is loaded with zero unless a special condition holds: A contains minus one if the requested move calls for distributing an empty bin, A contains one of the requested move leads to a capture and A contains two if the requested move leads to a free move.

On return from KALMOV, three courses of action are possible depending on these special conditions. If the requested move was illegal (the indicated bin was empty), the next highest numbered bin is tried. If the move is legal but does not result in a free

"I BOUGHT IT"
"My biggest loss of programming time using Snappware's EXTENDED BASIC is spent inserting my diskette."
SCOTT ADAMS - PRES. OF ADVENTURE INTL.

Reduce your programming time significantly with Snappware's EXTENDED BASIC. This program is written entirely in machine language for super fast execution and is fully integrated into the TRSDOS* BASIC interpreter requiring no user memory. Here are just some of the ways EXTENDED BASIC can make your programming task easier:

- Quick way to recover BASIC program following a New, System or Accidental re-boot
- Single character abbreviations for the most frequently used commands.
- Six single key stroke commands to list the first, last, previous, next or current program line. Even edit current line.
- A powerful cross-reference facility with output to display and/or printer.
- Ability to trace a variable through the code.
- Determine easily if a variable is in use.
- Permits programmer to display and/or print the value of any or all program variables.
- Identifies the variable type for all variables.
- Lists each element of any array separately.
- Program line renumbering facilities allowing for specification of an upper limit of the block of lines to be renumbered, relocation of renumbered blocks of code and duplication of blocks of code.
- Cross reference facility for key words and character strings including global replacement of key words.
- Compresses your BASIC program to an absolute minimum by removing extraneous information.
- Merge lines.
- Deletes statements that could not be executed.

If you consider your programming time to be worth money, call us and let us show you how to get more of it.

*TRSDOS™ Tandy Corporation

MODEL II $200.00
MODEL III $175.00

Time saving power at your fingertips.
CALL TOLL FREE:
1-800-543-4628
OHIO RESIDENTS CALL COLLECT: (513) 891-4496
3719 Mantell
Cinti., Ohio 45236

PMC SOFTWARE

PRESENTS

SPECIAL	NEW	Electric Pencil
DOSPLUS	**Stellar Escort**	
V 3.3	by BIG 5	PMC version of orig.
Disk $49.00	Tape 12.00	for PMC/Mod I/III
Save $50.00	Disk 15.00	Tape $24

UNBEATABLE PRICES!

	DISK		CASS	
BUSINESS	LIST PRICE	OUR PRICE	LIST PRICE	OUR PRICE
SMALL BUSINESS SYSTEMS GROUP				
Accounts Payable (48)	195 00	155 00	n/a	
Accounts Receivable (48)	195 00	155 00	n/a	
General Ledger (48)	195 00	155 00	n/a	
Inventory Control (48)	195 00	155 00	n/a	
Payroll (48)	195 00	155 00	n/a	
GAMES				
Adventure International				
Armor Patrol	24 95	19 00	19 95	15 00
Barlog - Maces and Magic #1	29 95	23 00	n/a	
Conquest of Chestwood	20 95	16 00	19 95	15 00
Earthquake San Francisco 1906 (I)	20 95	16 00	19 95	15 00
Eliminator	24 95	19 00	19 95	15 00
Lunar Lander	20 95	16 00	14 95	11 00
Missle Attack	20 95	16 00	14 95	11 00
Morlon's Fork - Maces and Magic #3 (I)	29 95	23 00	n/a	
Planetoids	20 95	16 00	19 95	15 00
Scot Adam's Adventure #1 #2 #3	39 95	31 00	n/a	
Scot Adam's Adventure #10 #11 #12	39 95	31 00	n/a	
Scot Adam's Adventure #4 #5 #6	39 95	31 00	n/a	
Scot Adam's Adventure #7 #8 #9	39 95	31 00	n/a	
Sky Warrior	20 95	16 00	14 95	11 00
Space Intruders	20 95	16 00	19 95	15 00
Star Fighter	29 95	23 00	24 95	19 00
Star Trek 3 5	19 95	15 00	14 95	11 00
Stone of Sysiphus - Maces and Magic #2 (I)	29 95	23 00	n/a	
Big Five				
Attack Force	19 95	15 00	15 95	12 00
Cosmic Fighter	19 95	15 00	15 95	12 00
Defense Command	19 95	15 00	15 95	12 00
Galaxy Invasion	19 95	15 00	15 95	12 00
Meteor Mission	19 95	15 00	15 95	12 00
Robot Attack	19 95	15 00	15 95	12 00
Super Nova	19 95	15 00	15 95	12 00
Cornsoft				
Scarfman	19 95	15 00	15 95	12 00
Space Castle	19 95	15 00	15 95	12 00
INFORMATION PROCESSING				
Adventure International				
Maxi Manager (48)	99 95	79 00	n/a	
OPERATING SYSTEMS				
Micro Systems Software				
Dos Plus V3 3 (I)	100 00	80 00	n/a	
UTILITIES				
Howe				
MON3 (I)	n/a		39 95	31 00
MON4 (I)	49 95	39 00	n/a	
STERM (I)	n/a		69 95	55 00
System Diagnostic	99 95	79 00	n/a	
WORD PROCESSING				
Michael Shreyer Software				
Electric Pencil (I)	n/a		100 00	24 00
Aspen Software				
Grammatik (I)	59 00	46 00	n/a	
Proof Edit (I)	30 00	23 00	n/a	
Proofreader (I)	54 00	42 00	n/a	
Soft-Screen (I) (48)	69 00	54 00	n/a	
Soft-Text (I) (48)	69 00	54 00	n/a	
MISCELLANEOUS				
Box of 10 5¼-inch Diskettes Microsette			25 00	
Box of 10 C-10 cassettes Microsette			7 50	
Box of 10 C-20 cassettes Microsette			9 00	
Box of 10 C-60 cassettes Microsette			11 00	
Box of 10 C-90 cassettes Microsette			15 00	
Adventure 1 thru 12 - Hints Sheets per adventure			1 00 ea.	

Software runs on PMC/LNW/MOD I/III
32K DISK/16K CASSETTE UNLESS MARKED.

475 ELLIS ST., MT. VIEW, CA 94043

Order Only CALL (415) 962-0318

Information CALL (415) 962-0221

Terms: FOR FAST DELIVERY, send certified checks, money orders, Visa or Master Card number and expiration date. Personal checks require 3 weeks. U.S.A. sales only. PRICES INCLUDE U.P.S. continental delivery (do not use P.O. Box). CALIFORNIA customers add 6½% tax. Prices subject to change.

Listing 1 continued

```
4559 2815      00353          JR      Z,EG1
4558 218046    00354          LD      HL,PLY1
455E 019D46    00355          LD      BC,SCORE
4561 3804      00356          JR      C,EG2
4563 218C46    00357          LD      HL,PLY2
4566 03        00358          INC     BC
4567 0A        00359 EG2      LD      A,(BC)
4568 3C        00360          INC     A
4569 02        00361          LD      (BC),A
456A CDA728    00362          CALL    28A7H
456D 21F846    00363          LD      HL,MS7
4570 CDA728    00364 EG1      CALL    28A7H
4573 D1        00365          POP     DE
4574 D5        00366          PUSH    DE
4575 5A        00367          LD      E,D
4576 1600      00368          LD      D,0
4578 2A9F46    00369          LD      HL,(SCORE+2)
457B 19        00370          ADD     HL,DE
457C 229F46    00371          LD      (SCORE+2),HL
457F D1        00372          POP     DE
4580 D5        00373          PUSH    DE
4581 1600      00374          LD      D,0
4583 2AA146    00375          LD      HL,(SCORE+4)
4586 19        00376          ADD     HL,DE
4587 22A146    00377          LD      (SCORE+4),HL
458A 114B3C    00378 EG3      LD      DE,3C4BH
458D 217F46    00379          LD      HL,PLY1-1
4590 CD3646    00380          CALL    MVND
4593 115B3C    00381          LD      DE,3C5BH
4596 218B46    00382          LD      HL,PLY2-1
4599 CD3646    00383          CALL    MVND
459C 21803C    00384          LD      HL,3C80H
459F 22204B    00385          LD      (4020H),HL
45A2 210647    00386          LD      HL,MS9
45A5 CDA728    00387          CALL    28A7H
45A8 DD219D46  00388          LD      IX,SCORE
45AC DD6E00    00389          LD      L,(IX+0)
45AF CD4B46    00390          CALL    WSINT
45B2 CDFC45    00391          CALL    SP11
45B5 DD6E01    00392          LD      L,(IX+1)
45B8 CD4B46    00393          CALL    WSINT
45BB CD0646    00394          CALL    CLRL
45BE 211147    00395          LD      HL,MS10
45C1 CDA728    00396          CALL    28A7H
45C4 D1        00397          POP     DE
45C5 6A        00398          LD      L,D
45C6 D5        00399          PUSH    DE
45C7 CD4B46    00400          CALL    WSINT
45CA CDFC45    00401          CALL    SP11
45CD D1        00402          POP     DE
45CE 6B        00403          LD      L,E
45CF CD4B46    00404          CALL    WSINT
45D2 CD0646    00405          CALL    CLRL
45D5 211C47    00406          LD      HL,MS12
45D8 CDA728    00407          CALL    28A7H
45DB 2A9F46    00408          LD      HL,(SCORE+2)
45DE CD4D46    00409          CALL    WINT
45E1 CDFC45    00410          CALL    SP11
45E4 2AA146    00411          LD      HL,(SCORE+4)
45E7 CD4D46    00412          CALL    WINT
45EA 3A9B46    00413          LD      A,(NGAME)
45ED 3C        00414          INC     A
45EE 329B46    00415          LD      (NGAME),A
45F1 47        00416          LD      B,A
45F2 3A9A46    00417          LD      A,(NGAMES)
45F5 B8        00418          CP      B
45F6 C22B43    00419          JP      NZ,GAME
45F9 C37341    00420          JP      4173H
45FC 060B      00421 SP11     LD      B,0BH
45FB 3E20      00422 SP11L    LD      A,20H
4600 CD3A03    00423          CALL    33AH
4603 10F9      00424          DJNZ    SP11L
4605 C9        00425          RET
4606 3E0D      00426 CLRL     LD      A,0DH
4600 C33A03    00427          JP      33AH
4608 AF        00428 EGAD     XOR     A
460C 0607      00429          LD      B,7
460E 86        00430 EG0      ADD     A,(HL)
460F 23        00431          INC     HL
4610 10FC      00432          DJNZ    EG0
4612 C9        00433          RET
4613 E5        00434 WNU      PUSH    HL
4614 D5        00435          PUSH    DE
4615 C5        00436          PUSH    BC
4616 CD9A0A    00437          CALL    0A9AH
4619 01BB02    00438          LD      BC,2BBH
461C C5        00439          PUSH    BC
461D 3E80      00440          LD      A,80H
461F CDBE0F    00441          CALL    0FBEH
4622 FDE5      00442          PUSH    IY
4624 D1        00443          POP     DE
4625 C1        00444          POP     BC
4626 48        00445          LD      C,B
4627 0680      00446          LD      B,0
4629 EDB0      00447          LDIR
462B C1        00448          POP     BC
462C D1        00449          POP     DE
462D B1        00450          POP     HL
```

Listing 1 continues

turn, the evaluation function is calculated for the resulting line of play. If the depth of analysis on entry to BSTMOV was one, the line of play has terminated with this move and the evaluation function may be calculated immediately from the board configuration pointed to by IX. This is done by the subroutine EVAL, which returns the value of the evaluation function in HL. However, if the depth of analysis is two or greater, the recursion must be invoked. The byte at IX-1, indicating whose turn it is, is complemented, and the depth of analysis contained in register B is decremented. BSTMOV is called, which ultimately returns the value of the evaluation function after the deepest hypothetical move in HL. The remainder of the process is independent of whether the recursion was invoked or not.

The third possibility is a free move resulting from the move tried by KALMOV. This case can be easily handled by calling BSTMOV recursively, but without decrementing the depth of analysis and without changing the indicator of whose turn it is. The result of this maneuver is that the depth of analysis parameter will apply to the number of *turns*, not the number of moves. Although this prolongs calculation time, it provides a fuller analysis and guarantees the opponent's moves will be inspected even if there are a multitude of possible free moves.

After the evaluation function for a particular trial move is calculated (either directly or by recursion), it is compared with the evaluation functions of previously tried moves. The extreme value (either maximum or minimum, depending on whose turn it is) and the bin number are saved on the stack to be loaded into registers HL and C, respectively, when BSTMOV is exited. When the six possible lines of play are investigated, the registers are restored and BSTMOV is exited. The exit may transfer control back to BSTMOV itself, but ultimately the highest level exit back to POSIT will be encountered.

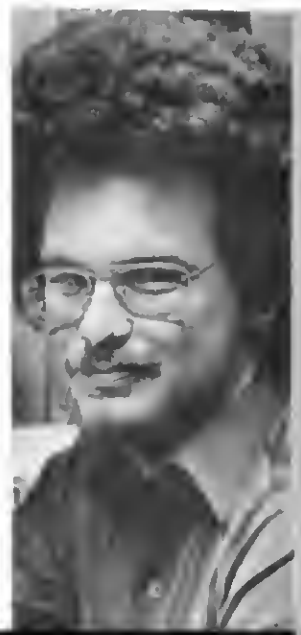
The remainder of the program is relatively straightforward. EVAL, KALMOV and GAMOVR are subroutines that perform calculations on the board pointed to by IX. In this program, which plays one strategy against another, there has to be a provision for using two different evaluation functions, depending on whose turn it is. This is done by allowing EVAL to refer to the byte at the location Boards, which indicates who is moving. This provision will not be in the next program. It will use the best evaluation function found to play against an external opponent. The final few instructions in EVAL add 2^{15} to the calculated evaluation function (in HL); this way it is easier to compare two unsigned numbers than two signed numbers, an operation which must be done frequently in BSTMOV. The particular evaluation functions used in Listing 1 are the evaluation functions F_A for player 1 and F_O for player 2 (Table 1).

The routine ENDGAM is entered when the game is over. It tallies the total number of games and counters won by each player

"I BOUGHT IT"

"My biggest loss of programming time using Snappware's EXTENDED BUILT IN FUNCTIONS is spent inserting my diskette."

SCOTT ADAMS - PRES. OF ADVENTURE INTL.



Snappware's EXTENDED BUILT IN FUNCTIONS is a collection of much needed additions to the TRSDOS* BASIC interpreter which greatly extends its convenience and utility. The following features become part of your BASIC language and provide the enhancements without requiring any additional memory. The most important component of EXTENDED BUILT IN FUNCTIONS is an in-memory sort routine, guaranteed to be the fastest general purpose in-memory sort on the market. Along with this you also receive other EXTENDED BUILT IN FUNCTIONS. Here is a sampling:

SRT—Sorts one or more arrays into a specified sequence.
FMT—Arranges data into a string variable as with PRINT USING.
PDAT/UDATS—Permits user to do arithmetic on dates.
PKS/UPKS—Compresses strings to save disk space.
ETIMS—Shows the difference between two times.
CLEAR—Specifies the number of file blocks to be allocated when you specify high memory and string space.
DELETE—Allows you to dynamically remove portions of a BASIC program.

In addition to these, there are functions unique to Model II and to Model III. The exclusives to Model II are long error messages and PEEK/POKE. The exclusives to Model III are:

SWAP—Supports exchange of variables with a single statement.
HEXS—Converts numbers to hexadecimal strings.
RESTORE—Allows you to set READ pointer to location of choice.

If you consider your programming time to be worth money, call us and let us show you how to get more of it.

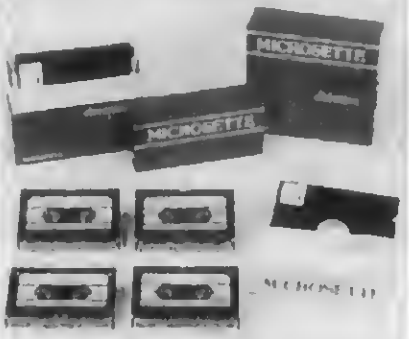
MODEL II $100.00
MODEL III ..... $ 75.00

*TRSDOS™ Tandy Corporation

Time saving power at your fingertips.
CALL TOLL FREE:
1-800-543-4628
OHIO RESIDENTS CALL COLLECT: (513) 891-4496
3719 Mantell
Cinti., Ohio 45236

MICROSETTE

DISKETTES CASSETTES



Microsette's reputation for quality and credibility has made us the leading supplier of low cost, short length cassettes. Now, we also offer 5¼-inch single sided, soft sector diskettes in single or double density. We give the same attention to quality and realiability for our disks as we do for our cassettes.

LOOK AT OUR PRICES

includes boxes and shipping

CASSETTES Boxes included		
Item	10 Pack	50 Pack
C-10	$ 7.50	$ 32.50
C-20	9.00	39.00
C-60	11.00	50.00
C-90	15.00	70.00
DISKETTES 5¼-inch		
MD-5	$25.00	$110.00

UPS shipment in Cont. USA incl.
We can not ship to P.O. Boxes

Length	Qty.	Price	Total
SUBTOTAL			
Calif. Cust add Sales Tax			
TOTAL			

Shipping address enclosed ☐
Check or money order enclosed ☐
Charge to. Visa ☐ MasterCard ☐
Account No.
Expiration Date

SIGNATURE ~312

MICROSETTE CO.

475 Ellis St., Mt. View,
CA 94043 (415) 968-1604

Listing 1 continued

```
462E C9          00451          RET
462F C5          00452 MVBCHL   PUSH    BC
4630 71          00453 MVB1     LD      (HL),C
4631 23          00454          INC     HL
4632 10FC        00455          DJNZ    MVB1
4634 C1          00456          POP     BC
4635 C9          00457          RET
4636 CD3E46      00458 MVND     CALL    MVN
4639 3E20        00459          LD      A,20H
463B 18          00460          DEC     DE
463C 12          00461          LD      (DE),A
463D C9          00462          RET
463E 060B        00463 MVN      LD      B,0BH
4640 23          00464 MV1      INC     HL
4641 7E          00465          LD      A,(HL)
4642 12          00466 MV2      LD      (DE),A
4643 13          00467          INC     DE
4644 B7          00468          OR      A
4645 C8          00469          RET     Z
4646 10F8        00470          DJNZ    MV1
4648 AF          00471          XOR     A
4649 18F7        00472          JR      MV2
464B 2600        00473 NSINT    LD      H,0
464D CD9A0A      00474 NINT     CALL    0A9AH
4650 010005      00475          LD      BC,500H
4653 3E80        00476          LD      A,80H
4655 CD8E0F      00477          CALL    0F8CH
4658 C3A720      00478          JP      20A7H
465B CD9AEA      00479 RNDM     CALL    0A9AH
465E CDC914      00480          CALL    14C9H
4661 CD3708      00481          CALL    0B37H
4664 2A2141      00482          LD      HL,(4121H)
4667 C9          00483          RET
4668 CDA720      00484 GTINT    CALL    20A7H
466B CD831B      00485          CALL    1B83H
466E D7          00486          RST     10H
466F C35A1E      00487          JP      1E5AH
0BBE             00488 STPOS    DEFS    0EH
4690 41          00489 PLY1     DEFM    'ALGORITHM 1'
468B 00          00490          DEFB    0
468C 41          00491 PLY2     DEFM    'ALGORITHM 2'
4697 00          00492          DEFB    0
4698 0BBB        00493 IQ       DEFW    0
469A 00          00494 NGAMES   DEFB    0
4698 00          00495 NGAME    DEFB    0
469C 00          00496 INICTH   DEFB    0
0006             00497 SCORE    DEFS    6
46A3 53          00498 MS1      DEFM    'SELF-PLAYING K A L A H'
4689 0C00        00499          DEFW    0C0H
46BB 4E          00500 MS3      DEFM    'NUMBER OF GAMES'
46CA 00          00501          DEFB    0
46CB 49          00502 MS4A     DEFM    'IQ(1)'
46D0 00          00503          DEFB    0
46D1 49          00504 MS4B     DEFM    'IQ(2)'
46D6 00          00505          DEFB    0
46D7 48          00506 MS5      DEFM    'HOW MANY COUNTERS TO START (3-9)'
46F7 00          00507          DEFB    0
46F8 20          00508 MS7      DEFM    ' WINS.'
46FE 00          00509          DEFB    0
46FF 41          00510 MS8      DEFM    'A TIE.'
4705 00          00511          DEFB    0
4706 47          00512 MS9      DEFM    'GAMES     '
4710 00          00513          DEFB    0
4711 43          00514 MS10     DEFM    'COUNTERS  '
471B 00          00515          DEFB    0
471C 43          00516 MS12     DEFM    'CUMULATIVE'
4726 00          00517          DEFB    0
4727             00518 BOARDS   DEFL    $
42E9             00519          END     START
```

EVALUATION FUNCTION	VALUE GAME NOT OVER	VALUE GAME OVER
F_A	$K_1 - K_2$	$K_1 - K_2 + S_1 - S_2$
F_B	$K_1 - K_2 + S_1 - S_2$	$K_1 - K_2 + S_1 - S_2$
F_C	$K_1 - K_2 + \frac{(K_1 + K_2)(S_1 - S_2)}{12N}$	$K_1 - K_2 + S_1 - S_2$
F_D	$K_1 - K_2$	$K_1 - K_2 + S_1 - S_2 + 2^{1A}$, PLAYER 1 WINS 0, TIE $K_1 - K_2 + S_1 - S_2 - 2^{1A}$, PLAYER 2 WINS

Table 1. Several potentially useful evaluation functions. The contents of the two kalahs are indicated by K_1 and K_2. The total contents of the circular bins belonging to each player are indicated by S_1 and S_2 and the number of counters initially placed in each bin is N.

in Score and displays this data on the screen. The program ends with several utility routines that make use of Basic ROM for input/output, binary to decimal conversion and random number generation, followed by data storage and ASCII messages.

Some Evaluation Functions

My first choice for the evaluation function was simply the difference between the number of counters in player 1's kalah (K_1) and the number of counters in player 2's kalah (K_2). If the position being evaluated is an end-of-game position, the number of counters remaining in each player's circular bins, B_1 and B_2, are added to the appropriate kalahs before this difference is calculated. This is the evaluation function F_A (Table 1). F_A is always positive at the end of a game

N=3	IQ_2	1	2	3
IQ_1				
2		70, 61		
3		90, 61	73, 59	
4		83, 62	85, 63	53, 51

N=6	IQ_2	1	2	3
IQ_1				
2		68, 61		
3		60, 58	70, 56	
4		60, 60	75, 58	65, 53

N=9	IQ_2	1	2	3
IQ_1				
2		65, 60		
3		95, 60	88, 56	
4		90, 61	80, 58	90, 55

Table 2. The superiority of strategies using greater depths of analysis with evaluation function F_A. Each pair of entries in the table indicates the fraction of games and the fraction of total counters won by the strategy using the higher depth of analysis (IQ_1) in a series of 20 games (a tie game is considered as half a game won by each player). The number of initial counters is indicated by N. In all cases, the strategy with the greater depth-of-analysis won most of the games and most of the counters against an opponent using the same evaluation function but a lower depth of analysis (IQ_2).

won by player 1. It is always negative if player 2 wins. This is intuitively necessary if a minimax strategy for F_A is to make sense. F_A also has the practical advantage of needing very little calculation to compute it.

Before comparing F_A with other evaluation functions, I wanted to confirm that an F_A constructed minimax strategy made sense. I tested strategies with different depths of analyses against each other. I ran playoffs between strategies using depths of analyses one to four and with three, six, or nine counters in each bin initially. For a series of 20 games, the strategy with the deeper depth of analysis always won more games, and more counters, than its opponent (Table 2). Potential quirks, such as offensive strategy being superior to a defensive one, is not true for this class of Kalah strategies.

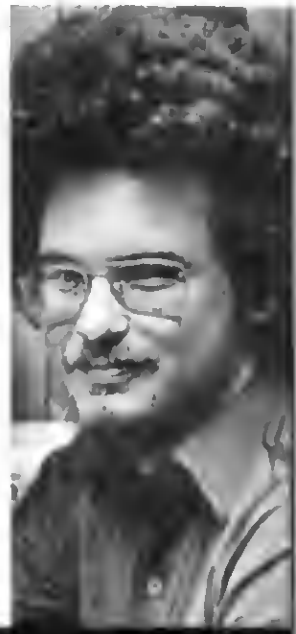
The evaluation function F_A only takes into account the number of counters in the circular bins when the game is over. By ignoring these counters before the end of the game, a strategy using F_A will not tend to accumulate counters on its side during the body of the game, and may be at a disadvantage relative to a strategy that does plan for the end of the game bin accumulation. This was the motivation for the evaluation function F_B, which sums all the counters on each side whether or not the game is over.

The evaluation functions F_A and F_B were compared using Listing 1 with EVAL suitably modified. Again, I compared the strategies generated by these evaluation functions for several values of the initial number of counters in each bin, to see if the relative merits of the evaluation functions depended on the length of the game (and on the

"I BOUGHT IT"

"My biggest loss of programming time using Snappware's AUTOMAP and AUTOFILE is spent inserting my diskette."

SCOTT ADAMS - PRES. OF ADVENTURE INTL



When working with direct files or creating a formatted screen, Autofile and Automap are indispensible aids.

Autofile is designed to automate for the BASIC programmer the task of moving data elements to and from a direct file. Previously, this was a time consuming chore because the FIELDed variables may not be directly referenced by user logic. The FIELD statement was eliminated, thereby relieving you of the guessing game as to where the FIELDed variable is. In addition, the LSET and the CVx functions are performed automatically. The software, when installed, becomes part of your BASIC interpreter providing the enhancements without additional memory.

Automap is designed to automate for the BASIC programmer the task of presenting information on the video display and accepting information from the keyboard operator. The software consists of two main components: the OFF-LINE COMPONENT used to describe to the system the screen formats and the ON-LINE COMPONENT from within your BASIC program to initialize a screen, send data to the video display and receive data from the keyboard operator. This facility when installed becomes part of your BASIC interpreter.

Both products complement one another and, if used in conjunction, can save a significant amount of programming time.

If you consider your programming time to be worth money, call us and let us show you how to get more of it.

Automap	MODEL II	$100.00
	MODEL III	$ 75.00
Autofile	MODEL II	$ 75.00
	MODEL III	$ 60.00

SNAPPWARE

Time saving power at your fingertips.

CALL TOLL FREE:

1-800-543-4628

OHIO RESIDENTS CALL COLLECT: (513) 891-4496

3719 Mantell
Cinti., Ohio 45236

REMSOFT, INC.

Let Your TRS-80® Teach You ASSEMBLY LANGUAGE

Tired of buying book after book on assembly language programming and still not knowing your **POP** from your **PUSH**?

REMSOFT proudly announces a more efficient way, using your own TRS-80® to learn the fundamentals of assembly language programming . . . at YOUR pace and YOUR convenience.

Our unique package **"INTRODUCTION TO TRS-80® ASSEMBLY PROGRAMMING"**, will provide you with the following:

- Ten 45-minute lessons on audio cassettes
- A driver program to make your TRS-80® video monitor serve as a blackboard for the instructor
- A display program for each lesson to provide illustration and reinforcement for what you are hearing
- Step-by-step dissection of complete and useful routines to test memory and to gain direct control over the keyboard, video monitor, and printer.
- How to access and use powerful routines in your Level II ROM

for Model 1

REMASSEM-1 (tape) only $69.95
REMASSEM-1 (disk) only $74.95

NOW AVAILABLE FOR MODEL 3

REMASSEM-3 (tape) $74.95
REMASSEM-3 (disk) $79.95

LEARN TRS-80® ASSEMBLY LANGUAGE DISK I/O

Your disk system and you can really step out with **REMSOFT'S** Educational Module **REMDISK-1**, a short course revealing the details of DISK I/O PROGRAMMING using assembly language. Intended for the student with experience in assembly language.

COURSE INCLUDES:

- Two 45-minute lessons on audio cassette
- A driver program to make your TRS-80® video monitor serve as a blackboard for the instructor
- A display program for each lesson to provide illustration and reinforcement for what you are hearing
- A booklet of comprehensive, fully commented program listings illustrating sequential file I/O, random-access file I/O, and track and sector I/O
- A diskette with machine-readable source codes for all programs discussed in both Radio Shack EDTASM and Macro formats
- Routines to convert from one assembler format to the other

Presently available for model 1 only

REMDISK-1 only $29.95

Dealer inquiries invited

These courses were developed and recorded by Joseph E. Willis and are based on the successful series of courses he has taught at Meta Technologies Corporation, the Radio Shack Computer Center, and other locations in Northern Ohio. The minimum system required is a Level II 16K RAM.

VISA

REMSOFT, INC.
571 E. 185 St.
Euclid, Ohio 44119
(216) 531-1338

MASTER CHARGE

129

SHIPPING CHARGES
$2.50 WITHIN UNITED STATES
$5.00 CANADA AND MEXICO
OTHER FOREIGN ORDERS ADD 20%
OHIO RESIDENTS ADD 6½% SALES TAX

TRS-80® IS A TRADEMARK OF TANDY CORP.

N	DEPTH OF ANALYSIS 1	2	3	4
3	69, 62	76, 65	90, 67	65, 57
6	85, 68	65, 57	73, 61	68, 55
9	85, 66	68, 60	90, 63	75, 57

Table 3. The fraction of games and counters won in a series of 40 games by a strategy using evaluation function F_A against a strategy using evaluation function F_B, for three, six and nine initial counters and four depths of analyses. In all cases, the strategy using F_A won more games and more counters than its opponent.

N	DEPTH OF ANALYSIS 1	2	3	4
3	54, 49	48, 47	64, 53	53, 51
6	64, 55	41, 48	61, 52	61, 52
9	70, 58	53, 51	71, 53	53, 51

Table 4. The fraction of games and counters won in a series of 40 games by a strategy using evaluation function F_A against a strategy using evaluation function F_C, for three, six and nine initial counters and four depths of analyses. In all but two cases, the F_A strategy won more games, and in all but three cases, more counters than its opponent.

proportion of midgame to endgame). I also compared the evaluation functions for different depths of analyses to see if this factor interested. Table 3 shows the results from a series of 40 games, with three, six and nine initial counters in each bin and depth of analysis one to four. In all cases, strategies using evaluation function F_A won more games and more counters than did strategies using evaluation function F_B.

Perhaps the problem with evaluation function F_B is it gives equal importance to the counters in the bins and the kalahs. Counters in the bins are only potential credits, becoming definite when the game ends. At the beginning of the game, counters in the bins are not nearly as likely to remain on a player's side as they are toward the end of the game. It might be preferable to calculate the evaluation function by weighting the counters in the bins according to an estimate of how near the end of the game is. One possibility for making this estimate is the fraction of counters already in the kalahs. Evaluation function F_C uses this fraction for counters in the bins until the end of

Program Listing 2

```
                ;KALAH VERSION 3 ... J. D. VICTOR
42E9                ORG     42E9H
0006    MAXIQ   EQU     6
42E9 ED7BA04B   START   LD      SP,(4BA0H)
42ED CDC901     DIALOG  CALL    1C9H
42F0 21CC47             LD      HL,SCORE
42F3 010006             LD      BC,600H
42F6 CD6047             CALL    MVBCHL
42F9 21D247             LD      HL,MS1
42FC CDA747             CALL    GTINT
42FF 7B                 LD      A,E
4300 FE02               CP      2
4302 30E9               JR      NC,DIALOG
4304 21F447             LD      HL,MS2-1
4307 328147             LD      (MODE),A
430A B7                 OR      A
430B CC5747             CALL    Z,GPN
430E 118247             LD      DE,PLY1
4311 CD7D47             CALL    MVN
4314 3001               LD      A,1
4316 CD5747             CALL    GPN
4319 118E47             LD      DE,PLY2
431C CD7D47             CALL    MVN
431F 3A8147             LD      A,(MODE)
4322 B7                 OR      A
4323 280E               JR      Z,GAME
4325 215548             LD      HL,MS4
4328 CDA747             CALL    GTINT
432B 7B                 LD      A,E
432C FE07               CP      MAXIQ+1
432E 30F5               JR      NC,DI1
4330 32CA47             LD      (IQ),A
4333 CDC901     GAME    CALL    1C9H
4336 211A46             LD      HL,MS5
4339 CDA747             CALL    GTINT
433C 7B                 LD      A,E
433D FE0A               CP      0AH
433F 30F2               JR      NC,GAME
4341 FE03               CP      3
4343 3802               JR      C,GAME
4345 32CB47             LD      (INICTR),A
                ;WHO GOES FIRST
4348 210200             LD      HL,2
434B CD9A47             CALL    RNDM
434E 7D                 LD      A,L
434F 3D                 DEC     A
4350 3D                 DEC     A
4351 32A848             LD      (BOARDS),A
                ;SET UP BOARD
4354 3ACB47             LD      A,(INICTR)
4357 4F                 LD      C,A
4358 0606               LD      B,6
435A 21A948             LD      HL,BOARDS+1
435D AF                 XOR     A
```

Listing 2 continues

N	DEPTH OF ANALYSIS 1	2	3	4
3	50, 50	51, 50	50, 49	51, 50
6	51, 50	51, 50	50, 50	53, 50
9	50, 50	50, 50	50, 49	50, 50

Table 5. The fraction of games and counters won in a series of 40 games by a strategy using evaluation function F_D against a strategy using evaluation function F_A, for three, six and nine initial counters and four depths of analyses. The strategy using F_D always won at least half of the games and won more than half of the games in five cases.

the game is reached, when the bin counters reach full importance. Strategies using this evaluation function generally ignore the bins early in the game and concentrate on building them up as the end of the game approaches. But, when evaluation function F_C is tested against F_A (Table 4), the more complicated evaluation function of F_C does not give a significant advantage over the more simple-minded evaluation function F_A. In fact, for most conditions, the strategy of ignoring the circular bins until the end of the game is better than the strategy of gradually paying more and more attention to them as the game progresses. The idea of building up the bins as the game progresses is a good one, but to make it pay off, it is necessary to find a more sophisticated measurement of how close the end of the game is. I leave it to the reader to find such a measure.

Although the evaluation function F_A is substantially better than F_B and somewhat better than F_C, it can be improved upon. Imagine a situation where a player has a move which will end the game with a sure win, and a second move which will result in a larger difference between the two kalahs but will not end the game, and therefore not necessarily win. A strategy using evaluation function F_A with depth-of-1 analysis will choose the second move, which may not lead to victory and may ultimately lead to fewer counters won. Evaluation function F_D fixes this loophole by modifying the evaluation function F_A in the event the position being evaluated is an endgame position: it gives a large bonus (2^{*4}) to the certain victor. Strategies using this evaluation function have a slight edge over those using F_A (Table 5). This slight advantage in games won may, however, be at the expense of a few less counters won. Because strategies using F_D did win a few more games than those using F_A in head-to-head competition and F_D is only minimally more complex to compute, I selected it for incorporation into my Kalah playing program.

Playing Against the Computer

Transforming the computer versus computer program into a computer versus human one involves a more extensive input and output (Program Listing 2).

The program first asks whether two humans will be playing against each other or one against the computer. It then asks for

"I BOUGHT IT"

"My biggest loss of programming time using Snappware's COLLEGE EDUCATED GARBAGE COLLECTOR is spent inserting my diskette."

SCOTT ADAMS - PRES. OF ADVENTURE INTL

The Snappware College Educated Garbage Collector (SNAPP-VI) is an intelligent processing function which greatly improves performance of typical BASIC applications. And here's why.

Microsoft uses a 'variable length string' in the BASIC interpreter. Each time the string is assigned a new value, it is relocated in a string pool. Periodically, the string pool must be reorganized and condensed into a single contiguous area. Performing this string space reclamation is time-consuming and inefficient because this approach evaluates and collects each string individually. The time required is roughly proportional to the square of the number of active strings in the resident program. During reclamation the system seems to 'lock-up' and does not respond to the operator until the process is completed.

This time consuming approach requires a better solution. Snappware has developed a solution which takes advantage of the auxiliary memory available. SNAPP-VI requires only four bytes per active string as a work area. When free storage space is available, our system temporarily borrows, uses and returns the space to the free storage pool when completed. If storage is not available, our system will temporarily transfer out to disk enough of the BASIC program to make room for our work area and return the 'paged out' information to its correct location when completed.

Benchmarked times show, in some situations, SNAPP-VI performs one hundred times as fast as the Microsoft approach.

If you consider your programming time to be worth money, call us and let us show you how to get more of it.

MODEL II $100.00
MODEL III ..... $ 75.00

*TRSDOS™ Tandy Corporation

SNAPPWARE

Time saving power at your fingertips.
CALL TOLL FREE:
1-800-543-4628
OHIO RESIDENTS CALL COLLECT: (513) 891-4496
3719 Mantell
Cinti., Ohio 45236

Looking for a Spelling Checker?
Get more than just a spelling checker — get

HEXSPELL 2™

the EVERYTHING checker

Hexagon Systems is proud to announce another first in text checking — an everything checker. Hexspell 2 checks not only dictionary words, but learns and checks codes, formulae and numbers which are so essential in many commercial and technical documents. With Hexspell 2 you define what characters make up a word, then teach Hexspell the new "words" it needs to check your text. This advanced system builds on the unique features of the original Hexspell (the first TRS-80 spelling checker). Hexspell 2 features a one-step interactive process, a word list that adapts itself to your word usage, a 25,000 word initial word list and more than three years of research and experience.

Hexspell 2 upgrade for registered owners of Hexspell Vers. 1 — $35 from Hexagon Systems or your nearest dealer.

Hexspell requires a TRS-80 Mod I or Mod III with 2 drives and 48K.

US $99

HEXAGON SYSTEMS
P.O. Box 397, Station A
Vancouver, B.C. Canada V6C 2N2
Telephone (604) 682-7646
Micronet 70235,1376

↙46

!!NOW AVAILABLE!!

NEW! IBM® PC-DOS

ISAM
I NDEX
SEQUENTIAL
ACCESS
METHOD

- ★ Get and Put Records to Disk File by "KEY"
- ★ Read File in Key Sequence Without Sorting
- ★ Delete Records Without Recopying File
- ★ Add Records to Disk Files in Any Sequence
- ★ Variable Key Length From 1 to 50 Characters
- ★ Machine Language or Basic Subroutines.

BUSINESS APPLICATION ADVANTAGES

- Improved Disk Utilization
- Easier Program Development
- Improved Operating Characteristics
- Reduce or Eliminate Sorting
- Improved Performance

ISAM SUBROUTINES — **Documentation**
ISAM UTILITIES — On Diskette $90.00

NEW! MACHINE LANGUAGE + BASIC SUBS — $140

—PLUS—**Free Mailing List Sample Application**
Add 6% Sales Tax for California Orders

TRS-80* MODEL I, II, & III and CPM* SOFTWARE FROM:

Johnson Associates -or- **Telephone Order Line**
P.O. Box 3069 **For Bank Card Sales**
Redding, CA 96049 **(916) 221-0740**

↙150

WRITE FOR FREE CATALOG

Listing 2 continued

```
435E 77        00054          LD      (HL),A
435F 23        00055          INC     HL
4360 CD6047    00056          CALL    MVBCHL
4363 77        00057          LD      (HL),A
4364 23        00058          INC     HL
4365 CD6047    00059          CALL    MVBCHL
4368 CDC901    00060 DRAWBD   CALL    1C9H
436B 21020C    00061          LD      HL,0C02H
436E 110400    00062          LD      DE,4
4371 FD21C53C  00063          LD      IY,3CC5H
4375 43        00064 D03      LD      B,E
4376 FD23      00065 D00      INC     IY
4378 FD74FC    00066          LD      (IY+0FCH),H
437B FD7434    00067          LD      (IY+34H),H
437E 10F6      00068          DJNZ    D00
4380 0E06      00069          LD      C,6
4382 FD3600AA  00070 D02      LD      (IY+0),0AAH
4386 FD360595  00071          LD      (IY+5),95H
438A FD36C0A0  00072          LD      (IY+0C0H),0A0H
438E FD36C590  00073          LD      (IY+0C5H),90H
4392 FD364002  00074          LD      (IY+40H),02H
4396 FD364581  00075          LD      (IY+45H),01H
439A 43        00076          LD      B,E
439B FD23      00077 D01      INC     IY
439D FD74C0    00078          LD      (IY+0C0H),H
43A0 FD7440    00079          LD      (IY+40H),B
43A3 10F6      00080          DJNZ    D01
43A5 FD19      00081          ADD     IY,DE
43A7 0D        00082          DEC     C
43A8 20D8      00083          JR      NZ,D02
43AA FD21C53D  00084          LD      IY,3DC5H
43AE 2D        00085          DEC     L
43AF 20C4      00086          JR      NZ,D03
43B1 FD21C13C  00087          LD      IY,3CC1H
43B5 114000    00088          LD      DE,40H
43B8 2E02      00089          LD      L,2
43BA FD3600A0  00090 D05      LD      (IY+0),0A0H
43BE FD360590  00091          LD      (IY+5),90H
43C2 0603      00092          LD      B,3
43C4 FD19      00093 D04      ADD     IY,DE
43C6 FD3600AA  00094          LD      (IY+0),0AAH
43CA FD360595  00095          LD      (IY+5),95H
43CE 10F4      00096          DJNZ    D04
43D0 FD364002  00097          LD      (IY+40H),02H
43D4 FD364501  00098          LD      (IY+45H),01H
43D8 FD21F93C  00099          LD      IY,3CF9H
43DC 2D        00100          DEC     L
43DD 20D8      00101          JR      NZ,D05
43DF 21693C    00102          LD      HL,3C69H
43E2 060E      00103          LD      B,0EH
43E4 0E3C      00104          LD      C,'<'
43E6 CD6047    00105          CALL    MVBCHL
43E9 21493E    00106          LD      HL,3E49H
43EC 0E3E      00107          LD      C,'>'
43EE CD6047    00108          CALL    MVBCHL
43F1 210147    00109          LD      HL,PLY1-1
43F4 114A3C    00110          LD      DE,3C4AH
43F7 CD7547    00111          CALL    MVND
43FA 210047    00112          LD      HL,PLY2-1
43FD 116A3E    00113          LD      DE,3E6AH
4400 CD7547    00114          CALL    MVND
4403 010206    00115 POSIT    LD      BC,602H
4406 DD21A940  00116          LD      IX,BOARDS+1
440A FD21433D  00117          LD      IY,3D43H
440E 2600      00118          LD      H,0
4410 DD6E00    00119          LD      L,(IX+0)
4413 CD4447    00120          CALL    WNU
4416 FD21703D  00121          LD      IY,3D70H
441A DD6E07    00122          LD      L,(IX+7)
441D CD4447    00123          CALL    WNU
4420 FD21C83C  00124          LD      IY,3CC8H
4424 110800    00125          LD      DE,8
4427 DD23      00126 PS1      INC     IX
4429 DD6E00    00127          LD      L,(IX+0)
442C CD4447    00128          CALL    WNU
442F FD19      00129          ADD     IY,DE
4431 10F4      00130          DJNZ    PS1
4433 7A        00131          LD      A,D
4434 07        00132          DR      A
4435 200D      00133          JR      NZ,NXTMDV
4437 FD21F33D  00134          LD      IY,3DF3H
443B 0606      00135          LD      B,6
443D DD23      00136          INC     IX
443F 11F8FF    00137          LD      DE,-8
4442 18E3      00138          JR      PS1
4444 3AA840    00139 NXTMOV   LD      A,(BOARDS)
4447 2F        00140          CPL
4448 32A840    00141          LD      (BOARDS),A
444B CD3E47    00142          CALL    DELAY
444E DD21A940  00143          LD      IX,BOARDS+1
4452 CD4E46    00144          CALL    GAMOVR
4455 CA6846    00145          JP      Z,ENDGAM
4458 21C03E    00146 ASKMOV   LD      HL,3EC0H
445B 222040    00147          LD      (4020H),HL
445E 012040    00148          LD      BC,4020H
4461 CD6047    00149          CALL    MVBCHL
4464 210247    00150          LD      HL,PLY1
4467 3AA848    00151          LD      A,(BOARDS)
```

Listing 2 continues

Call or Write Your Nearest Snappware Distributor

MICRO-80
284 Goodwood Road
Clarence Park
Adelaide South Australia
Ph-(08) 271724

DIGI-TEK SYSTEMS
65 Thornridge Circle
Kitchener Ontario N2M-4V9
Ph-(519) 742-8205

STRAWFLOWER ELECTRONICS
50 North Cabrillo
Half Moon Bay
California 94019
Ph-(415) 726-9125

COMPUTER MAGIC
115 Willshire Avenue
Louisville, Kentucky 40207
Ph-(502) 893-9334

E-C DATA
Tornevangsvej 85
P.O.B. 116
DK-3460
Birkerod Denmark
Ph +45/2/81/ 91 91

SYSTEM SOFT
49, Dunvegan Drive
Rise Park
Nottingham, England
NG5 5BX
Ph-(0602) 276559

CUSTOM COMPUTING
104 Bushwick Rd.
Poughkeepsie, NY 12603
Ph-(914)-471-9318

AEROCOMP
Redford Airport
Hanger 6
Dallas, Texas 75232
Ph-(214) 339-5104

NOTICE:

Snappware Goes On Trial! You Be The Judge!

Snappware knows your programming time is valuable. That's why we are offering a trial package that will cut your programming time up to 75%!

This unprecedented offer allows you to judge for yourself the value of our software using your hardware at your convenience. Our five best selling products: EXTENDED BASIC, EXTENDED BUILT IN FUNCTIONS, COLLEGE EDUCATED GARBAGE COLLECTOR, AUTOMAP and AUTOFILE, are all available to you on a trial basis for only $30.00 for the Model II and $35.00 for the Model III. We're convinced that after you see how well our software helps you perform programming tasks, you will purchase them like thousands of others have.

Our trial package consists of a master diskette which may be used to create one working copy. Your purchase price for the trial package will be credited toward the purchase of any software Snappware sells.

If for any reason you are not satisfied, just return the trial diskette and working copy and we will refund your money, no questions asked. With an unconditional guarantee like this, you can't lose.

Call our toll free number 800-543-4628 to put us on trial. We're sure your verdict will be: Snappware saves you time and money.

MODEL II Trial Package $30.00
MODEL III Trial Package $35.00

Time saving power at your fingertips.
CALL TOLL FREE:
1-800-543-4628
OHIO RESIDENTS CALL COLLECT: (513) 891-4496
3719 Mantell
Cinti., Ohio 45236

See List of Advertisers on page 338

DISCOUNT

COMPARE OUR PRICES!

FREE SHIPPING *on all pre-paid cash orders

DISKIT III™

MODEL III UPGRADE FEATURES:

- Gold Plated Edge Connectors
- Switching Power Supply (Runs cooler)
- 40/80 Track supported
- Single/Dual Head supported
- Metal Disk Drive Brackets
- All Hardware and Cables for 2 Disk Drive
- 1 Hour or Less for Installation
- 100% Compatible
- No Soldering Needed
- 180 Days Warranty on Controller

DISKIT III	DISKIT III	DISKIT III
W/Out Drives	W/One Tandon 100-140 Tack Drive	W/Two Tandon Disk Drives
$329.00	$549.00	$764.00

DEALER INQUIRIES WELCOME

EPSON

NEW LOWER PRICES! WITH GRAPHTRAX

MX-80 $459.00
MX-80 F/T $559.00
MX-100 $729.00

THE NEW MICROBUFFER™ ACCEPTS DATA AS FAST AS YOUR COMPUTER CAN SEND IT

MBP—16K Parallel	$159.00
MBS— 6K Serial	$159.00
INTERFACE CARDS	
8141 (RS-232)	$ 75
8150 (2K Buffered RS-232)	$150
8151 (IEEE 488)	$ 55
8131 (Apple Card)	$ 85
8230 (Apple Cable)	$ 25
8220 (TRS-80 Cable)	$ 25
OKIDATA MICROLINE 82A	$ 549.00
OKIDATA MICROLINE 83A	$ 799.00
OKIDATA MICROLINE 84	$1199.00

PARAGON magnetics™ Gold

MTC's premium Single Sided Soft-Sectored DOUBLE DENSITY 5 4-inch diskettes with reinforcing HUB-RINGS. Individually 100% ERROR free certified. Invest in GOLD!

PARAGON MAGNETICS GOLD... $23.95

MDS DISPAK™

(DOUBLE-DENSITY) Single-sided soft-sectored 5¼ inch 100% error-free certified. These diskettes are fully guaranteed for one year against defects (return any bad diskettes) and we will replace FREE.

MDS Disk Pak Box of 10 ..... $21.95
5 Boxes of 10 Disks..... $99.95

MODEL I complete MODEL III

DISK DRIVES

Includes Case, Power Supply
90 Days 100% Warranty

$289.95

BARE DRIVES

TANDON 5¼ INCH

100 1 SINGLE HEAD 40 TRK	229.00
100 2 DUAL HEAD 40 TRK	299.00
100 3 SINGLE HEAD 80 TRK	299.00
100 4 DUAL HEAD 80 TRK	429.00

MODEMS

UDS 103 LP DIRECT CONNECT	175.00
UDS 103 JLP AUTO ANS	209.00
HAYES MICROMODEM II (APPLE)	299.00
HAYES 100 MODEM (S-100)	325.00
HAYES SMART MODEM (RS-232)	249.00

VERBATIM

Soft-Sectored Diskettes

5¼" 1S/DDen (MD525-01)	$26.95
5¼" 2S/DDen (MD550-01)	$39.95
5¼" 2S/4Den (MD557-01)	$51.50
8" 1S/DDen (FD34-8000)	$43.95

Hard-Sectored Diskettes

5¼" 1S/DDen 10-sector (MD525-10)	$26.95
5¼" 2S/DDen 10-sector (MD550-10)	$39.95
5¼" 2S/4Den 10-sector (MD557-10)	$51.50

Supplies

HUB RING KIT for 5¼" disks	$10.95
HUB RING KIT for 8" disks	$12.95
REFILLS (50 Hub Rings)	$ 5.95
CLEANING KIT for 5¼" drives	$24.95
5¼-inch diskette case	$ 3.50
8-inch diskette case	$ 3.95
5¼-inch File Box for 50 diskettes	$24.95

DISKIT III IS A ™ OF MDS

MOST ORDERS SHIPPED WITHIN ONE BUSINESS DAY. Products damaged in transit will be exchanged.

Prices, Specifications and Offerings subject to change without notice.

WE ACCEPT
- VISA
- MASTER CHARGE
- CHECKS
- MONEY ORDERS
- C.O.D.

- Add $3.00 for shipping & handling
- $3.00 EXTRA for C.O.D.
- Ohio residents add 5½ sales tax

MDS MICRO DATA SUPPLIES
7541 MENTOR AVENUE/#108
MENTOR, OHIO 44060
Call: (216) 951-6502

✓459

Listing 2 continued

```
446A B7        00152          OR      A
446B 2003      00153          JR      Z,AM1
446D 21BE47    00154          LD      HL,FLY2
4470 CDA720    00155 AM1      CALL    20A7H
4473 213B48    00156          LD      HL,MS6
4476 3AB147    00157          LD      A,(MODE)
4479 B7        00158          OR      A
447A 2019      00159          JR      Z,AM2
447C 3AA840    00160          LD      A,(BOARDS)
447F B7        00161          OR      A
4480 2013      00162          JR      NZ,AM2
               00163 ;CALCULATE TRS-80'S MOVE
4482 CDA728    00164          CALL    28A7H
4485 3E3D      00165          LD      A,'='
4487 CD3A03    00166          CALL    33AH
448A CDD944    00167          CALL    TRS00M
448D 7D        00168          LD      A,L
448E C631      00169          ADD     A,'1'
4490 CD3A03    00170          CALL    33AH
4493 1814      00171          JR      GOTMV
4495 CDA747    00172 AM2      CALL    GTINT
4498 6B        00173          LD      L,E
4499 2D        00174          DEC     L
449A 3805      00175          JR      C,AM3
449C 7D        00176          LD      A,L
449D FE06      00177          CP      6
449F 3808      00178          JR      C,GOTMV
44A1 218748    00179 AM3      LD      HL,ILGL
44A4 CD3447    00180          CALL    SPESHL
44A7 18AF      00181          JR      ASKMOV
44A9 DD21A940  00182 GOTMV    LD      IX,BOARDS+1
44AD DD66FF    00183          LD      H,(IX+0FFH)
44B0 CDBC45    00184          CALL    KALMOV
44B3 B7        00185          OR      A
44B4 281D      00186          JR      S,GM1
44B6 3D        00187          DEC     A
44B7 2000      00188          JR      NZ,GM2
44B9 219448    00189          LD      HL,CAPT
44BC CD3447    00190          CALL    SPESHL
44BF 1812      00191          JR      GM1
44C1 3D        00192 GM2      DEC     A
44C2 28DD      00193          JR      NS,AM3
44C4 219D48    00194          LD      HL,PTRN
44C7 CD3447    00195          CALL    SPESHL
44CA 3AA840    00196          LD      A,(BOARDS)
44CD 2F        00197          CPL
44CE 32A840    00198          LD      (BOARDS),A
44D1 1000      00199          JR      GN1
44D3 CD3E47    00200 GM1      CALL    DELAY
44D6 C33344    00201          JP      POSIT
44D9 DD21A940  00202 TRS00M   LD      IX,BOARDS+1
44DD 3ACA47    00203          LD      A,(IO)
44E0 B7        00204          OR      A
44E1 2007      00205          JR      Z,DUMB
44E3 47        00206          LD      B,A
44E4 CDFC44    00207          CALL    BSTMOV
44E7 69        00208          LD      L,C
44E8 2D        00209          DEC     L
44E9 C9        00210          RET
44EA 210600    00211 DUMB     LD      HL,6
44ED CD9A47    00212          CALL    RNDM
44F0 2D        00213          DEC     L
44F1 4D        00214          LD      C,L
44F2 11AA48    00215          LD      DE,BOARDS+2
44F5 19        00216          ADD     HL,DE
44F6 7E        00217          LD      A,(NL)
44F7 B7        00218          OR      A
44F8 28F0      00219          JR      Z,DUMB
44FA 69        00220          LD      L,C
44FB C9        00221          RET
               00222 ;ENTRY: IX->ACTIVE BOARD,A=TURN,B=IO
               00223 ;EXIT: C=BIN 4(1-6),HL=EVAL
44FC F5        00224 BSTMOV   PUSH    AF
44FD 0E08      00225          LD      C,8
44FF CD4E46    00226          CALL    GAMOVR
4502 2002      00227          JR      H2,BS0
4504 F1        00228          POP     AF
4505 C9        00229          RET
4506 C5        00230 BS0      PUSH    BC
4507 D5        00231          PUSH    DE
4508 E5        00232          PUSH    HL
4509 DDE5      00233          PUSH    IX
450B FDE5      00234          PUSH    IY
450D 210000    00235          LD      HL,0
4510 39        00236          ADD     HL,SP
4511 E5        00237          PUSH    HL
4512 FDE1      00238          POP     IY
4514 3E06      00239          LD      A,6
4516 FD6E02    00240 BS1      LD      L,(IY+2)
4519 FD6603    00241          LD      H,(IY+3)
451C 2B        00242          DEC     HL
451D 5D        00243          LD      E,L
451E 54        00244          LD      D,H
451F 01FF00    00245          LD      BC,0FFH
4522 09        00246          ADD     HL,BC
4523 EB        00247          EX      DE,HL
4524 EDB8      00248          LDDR
4526 23        00249          INC     HL
4527 E5        00250          PUSH    HL
```

Listing 2 continues

the name(s) of the human player(s). If the computer is an opponent, the program asks for a specification of the depth of analysis, in the range zero to six. (Warning: Do not use levels five or six unless you are willing to wait an hour or more for the computer to move!) Specifying a depth-of-zero strategy makes the program choose its moves at random. The last request is for the number of counters to fill each bin with at the start of the game. The program then randomly chooses a player to go first and starts the game.

The routine DRAWBD, executed before each move, draws a picture of the kalahs and the bins on the monitor and indicates how many counters are in each pit. The program then either calculates its move, or asks for the human's move. It checks the human's move making sure it is correctly specified as a bin number in the range one to six and that the indicated bin is not empty. Before the move is executed, the computer displays an appropriate message if a free turn or a capture will be generated. At the end of the game, the score is tallied and the program asks if additional play is desired.

Suggested Modifications

Although the program plays a respectable game with depth-of-four analysis, it is not beyond improvements. There are a few ways to shorten computer response time. For instance, when a chosen line of play will lead to a free move for the program, it could use the previous calculations without having to work out the free move from scratch. A second, independent method, more general because it applies equally well to games with no free moves, is a kind of pruning of the tree of hypothetical moves. Imagine a depth-of-two strategy is being calculated by player 1. Player 1 will choose the move for which player 2's best response will lead to the maximum evaluation function. Thus, if for a particular trial move for player 1, there exists a reply for player 2 which results in an evaluation function less than those previously encountered, this move for player 1 can be rejected without having to consider the remaining possible replies to it. This method of pruning the tree of hypothetical moves could be embodied into BSTMOV at a depth-of-two, so higher depth-of-analysis strategies, which call the depth-of-two strategy, will be able to make use of this savings.

These enhancements will make the program run faster but not any smarter. The real challenge of writing a sophisticated game playing program is to develop a way to determine which lines of play are fruitful and analyze those in greater detail, rather than lines of play that are silly. This level of sophistication is not a necessity in Kalah. Each player has only a relatively small number of moves, but it would be hard to do without in a game such as Go or chess. Good luck! ■

Jonathan Victor is a neurology resident at New York Hospital.

Listing 2 continued

```
4528 D0E1      00251          POP     IX
452A 6F        00252          LD      L,A
452B 2D        00253          DEC     L
452C DD66FF    00254          LD      H,(IX+0FFH)
452F 08        00255          EX      AF,AF'
4530 CD8C45    00256          CALL    KALMOV
4533 FD4609    00257          LD      B,(IY+9)
4536 CB4F      00258          BIT     1,A
4538 2810      00259          JR      Z,BS3
453A 0F        00260          RRCA
453B 301C      00261          JR      NC,BS2
453D 08        00262 BS4      EX      AF,AF'
453E 3D        00263          DEC     A
453F 20D5      00264          JR      NZ,BS1
4541 FDE1      00265          POP     IY
4543 DDE1      00266          POP     IX
4545 E1        00267          POP     HL
4546 E1        00268          POP     HL
4547 C1        00269          POP     BC
4548 F1        00270          POP     AF
4549 C9        00271          RET
454A 05        00272 BS3      DEC     B
454B 2005      00273          JR      NZ,BS5
454D CD8645    00274          CALL    EVAL
4550 100C      00275          JR      BS6
4552 DD7EFF    00276 BS5      LD      A,(IX+0FFH)
4555 2F        00277          CPL
4556 DD77FF    00278          LD      (IX+0FFH),A
4559 08        00279 BS2      EX      AF,AF'
455A CDFC44    00280          CALL    BSTMOV
455D 08        00281          EX      AF,AF'
455E FD7E08    00282 BS6      LD      A,(IY+8)
4561 B7        00283          OR      A
4562 2815      00284          JR      Z,UPDATE
4564 FD5E06    00285          LD      E,(IY+6)
4567 FD5607    00286          LD      D,(IY+7)
456A B7        00287          OR      A
456B ED52      00288          SBC     HL,DE
456D 28C8      00289          JR      Z,BS4
456F DD7EF8    00290          LD      A,(IX+0F8H)
4572 3001      00291          JR      C,BS7
4574 2F        00292          CPL
4575 0F        00293 BS7      RRCA
4576 30C5      00294          JR      NC,BS4
4578 19        00295          ADD     HL,DE
4579 00        00296 UPDATE   EX      AF,AF'
457A FD7708    00297          LD      (IY+8),A
457D 08        00298          EX      AF,AF'
457E FD7506    00299          LD      (IY+6),L
4581 FD7407    00300          LD      (IY+7),H
4584 18B7      00301          JR      BS4
4586 D9        00302 EVAL     EXX
4587 AF        00303          XOR     A
4588 67        00304          LD      H,A
4589 57        00305          LD      D,A
458A 47        00306          LD      B,A
458B DD6E08    00307          LD      L,(IX+8)
458E DD5E07    00308          LD      E,(IX+7)
4591 ED52      00309          SBC     HL,DE
4593 CC4E46    00310          CALL    GAMOVR
4596 201C      00311          JR      NZ,EV1
4598 DDE5      00312          PUSH    IX
459A 0606      00313          LD      B,6
459C DD23      00314 EV2      INC     IX
459E DD5E00    00315          LD      E,(IX+0)
45A1 19        00316          ADD     HL,DE
45A2 DD5E07    00317          LD      E,(IX+7)
45A5 B7        00318          OR      A
45A6 ED52      00319          SBC     HL,DE
45A8 10F2      00320          DJNZ    EV2
45AA DDE1      00321          POP     IX
45AC 7C        00322          LD      A,H
45AD B5        00323          OR      L
45AE 2804      00324          JR      Z,EV1
45B0 7C        00325          LD      A,H
45B1 EE40      00326          XOR     40H
45B3 67        00327          LD      H,A
45B4 E5        00328 EV1      PUSH    HL
45B5 D9        00329          EXX
45B6 E1        00330          POP     HL
45B7 7C        00331          LD      A,H
45B8 EE80      00332          XOR     80H
45BA 67        00333          LD      H,A
45BB C9        00334          RET
               00335 ;ENTRY: IX->ACTIVE BOARD,L=BIN #(B-5),H=TURN(0,-1)
               00336 ;EXIT: A=-1 FOR EMPTY BIN,1 FOR CAPTURE,2 FOR FREE MOVE
45BC C5        00337 KALMOV   PUSH    BC
45BD D5        00338          PUSH    DE
45BE DDE5      00339          PUSH    IX
45C0 010700    00340          LD      BC,7
45C3 50        00341          LD      D,B
45C4 5D        00342          LD      E,L
45C5 1C        00343          INC     E
45C6 7C        00344          LD      A,H
45C7 B7        00345          OR      A
45C8 2003      00346          JR      Z,KM0
45CA 79        00347          LD      A,C
45CB 83        00348          ADD     A,E
45CC 5F        00349          LD      E,A
```

Listing 2 continues

Listing 2 continued

```
45CD DD19      00350 KM0     ADD     IX,DE
45CF DD7E00    00351         LD      A,(IX+0)
45D2 B7        00352         OR      A
45D3 2006      00353         JR      NZ,KM1
45D5 3D        00354         DEC     A
45D6 DDE1      00355 KM2     POP     IX
45D8 D1        00356 KM3     POP     DE
45D9 C1        00357         POP     BC
45DA C9        00358         RET
45DB DD360000  00359 KM1     LD      (IX+0),0
45DF 57        00360         LD      D,A
45E0 DD2B      00361 KL      DEC     IX
45E2 1D        00362         DEC     E
45E3 2012      00363         JR      NZ,NK1
45E5 79        00364         LD      A,C
45E6 87        00365         ADD     A,A
45E7 5F        00366         LD      E,A
45E8 DD09      00367         ADD     IX,BC
45EA DD09      00368         ADD     IX,BC
45EC 14        00369         INC     D
45ED 7C        00370         LD      A,H
45EE B7        00371         OR      A
45EF 2013      00372         JR      NZ,DIDT
45F1 15        00373         DEC     D
45F2 DD34F2    00374         INC     (IX+0F2H)
45F5 180D      00375         JR      DIDT
45F7 7B        00376 NK1     LD      A,E
45F8 91        00377         SUB     C
45F9 2006      00378         JR      NZ,NK2
45FB 14        00379         INC     D
45FC 7C        00380         LD      A,H
45FD 87        00381         OR      A
45FE 2804      00382         JR      Z,DIDT
4600 15        00383         DEC     D
4601 DD3400    00384 NK2     INC     (IX+0)
4604 15        00385 DIDT    DEC     D
4605 20D9      00386         JR      NZ,KL
4607 7B        00387         LD      A,E
4608 91        00388         SUB     C
4609 2004      00389         JR      NZ,NEK2
460B 3E02      00390 FT      LD      A,2
460D 18C7      00391         JR      KM2
460F 91        00392 NEK2    SUB     C
4610 28F9      00393         JR      Z,FT
4612 81        00394         ADD     A,C
4613 AC        00395         XOR     H
4614 17        00396         RLA
4615 3003      00397         JR      C,OWNSID
4617 AF        00398 KM4     XOR     A
4618 18BC      00399         JR      KM2
461A DD7E00    00400 OWNSID  LD      A,(IX+0)
461D 3D        00401         DEC     A
461E 20F7      00402         JR      NZ,KM4
4620 FDE3      00403         EX      (SP),IY
4622 FDE5      00404         PUSH    IY
4624 79        00405         LD      A,C
4625 87        00406         ADD     A,A
4626 93        00407         SUB     E
4627 5F        00408         LD      E,A
4628 FD19      00409         ADD     IY,DE
462A D1        00410         POP     DE
462B D5        00411         PUSH    DE
462C FD7E00    00412         LD      A,(IY+0)
462F B7        00413         OR      A
4630 2016      00414         JR      Z,NOCAP
4632 DD360000  00415         LD      (IX+0),0
4636 FD360000  00416         LD      (IY+0),0
463A 3C        00417         INC     A
463B F5        00418         PUSH    AF
463C 7C        00419         LD      A,H
463D B7        00420         OR      A
463E EB        00421         EX      DE,HL
463F 2001      00422         JR      Z,CAP1
4641 09        00423         ADD     HL,BC
4642 F1        00424 CAP1    POP     AF
4643 86        00425         ADD     A,(HL)
4644 EB        00426         EX      DE,HL
4645 12        00427         LD      (DE),A
4646 3E01      00428         LD      A,1
4648 DDE1      00429 NOCAP   POP     IX
464A FDE1      00430         POP     IY
464C 188A      00431         JR      KM3
464E C5        00432 GAMOVR  PUSH    BC
464F E5        00433         PUSH    HL
4650 01FF06    00434         LD      BC,06FFH
4653 DDE5      00435         PUSH    IX
4655 E1        00436         POP     HL
4656 AF        00437 GV1     XOR     A
4657 23        00438 GV2     INC     HL
4658 86        00439         ADD     A,(HL)
4659 10FC      00440         DJNZ    GV2
465B 2003      00441         JR      NZ,GV3
465D E1        00442 GV4     POP     HL
465E C1        00443         POP     BC
465F C9        00444         RET
4660 23        00445 GV3     INC     HL
4661 0606      00446         LD      B,6
4663 0C        00447         INC     C
4664 28F7      00448         JR      Z,GV4
4666 10EE      00449         JR      GV1
4668 CDC901    00450 ENDGAM  CALL    01C9H
466B 21A946    00451         LD      HL,BOARDS+1
466E CD2C47    00452         CALL    EGAD
4671 57        00453         LD      D,A
4672 CD2C47    00454         CALL    EGAD
4675 5F        00455         LD      E,A
4676 D5        00456         PUSH    DE
4677 BA        00457         CP      D
4678 214A48    00458         LD      HL,MS0
467B 2815      00459         JR      Z,EG1
467D 21B247    00460         LD      HL,PLY1
4680 01CC47    00461         LD      BC,SCORE
4683 3804      00462         JR      C,EG2
4685 21BE47    00463         LD      HL,PLY2
4688 03        00464         INC     BC
4689 0A        00465 EG2     LD      A,(BC)
468A 3C        00466         INC     A
468B 02        00467         LD      (BC),A
468C CDA728    00468         CALL    28A7H
468F 214348    00469         LD      HL,MS7
4692 CDA728    00470 EG1     CALL    28A7H
4695 D1        00471         POP     DE
4696 D5        00472         PUSH    DE
4697 5A        00473         LD      E,D
4698 1600      00474         LD      D,0
469A 2ACE47    00475         LD      HL,(SCORE+2)
469D 19        00476         ADD     HL,DE
469E 22CE47    00477         LD      (SCORE+2),HL
46A1 D1        00478         POP     DE
46A2 D5        00479         PUSH    DE
46A3 1600      00480         LD      D,0
46A5 2AD047    00481         LD      HL,(SCORE+4)
46A8 19        00482         ADD     HL,DE
46A9 22D047    00483         LD      (SCORE+4),HL
46AC 113B3C    00484 EG3     LD      DE,3C4BH
46AF 21B147    00485         LD      HL,PLY1-1
46B2 CD7547    00486         CALL    MVND
46B5 11583C    00487         LD      DE,3C58H
46B8 21BD47    00488         LD      HL,PLY2-1
46BB CD7547    00489         CALL    MVND
46BE 21803C    00490         LD      HL,3C80H
46C1 222848    00491         LD      (4828H),HL
46C4 215148    00492         LD      HL,MS9
46C7 CDA728    00493         CALL    28A7H
46CA DD21CC47  00494         LD      IX,SCORE
46CE DD6E00    00495         LD      L,(IX+0)
46D1 CD0A47    00496         CALL    WSINT
46D4 CD1D47    00497         CALL    SP11
46D7 DD6E01    00498         LD      L,(IX+1)
46DA CD0A47    00499         CALL    WSINT
46DD CD2747    00500         CALL    CLRL
46E0 215C48    00501         LD      HL,NS10
46E3 CDA728    00502         CALL    28A7H
46E6 D1        00503         POP     DE
46E7 6A        00504         LD      L,D
46E8 D5        00505         PUSH    DE
46E9 CD8A47    00506         CALL    WSINT
46EC CD1D47    00507         CALL    SP11
46EF D1        00508         POP     DE
46F0 68        00509         LD      L,E
46F1 CD0A47    00510         CALL    WSINT
46F4 CD2747    00511         CALL    CLRL
46F7 216748    00512         LD      HL,HS12
46FA CDA728    00513         CALL    28A7H
46FD 2ACE47    00514         LD      HL,(SCORE+2)
4700 CD0C47    00515         CALL    WINT
4703 CD1D47    00516         CALL    SP11
4706 2AD047    00517         LD      HL,(SCORE+4)
4709 CD0C47    00518         CALL    WINT
470C CD2747    00519         CALL    CLRL
470F 217248    00520         LD      HL,MS11
4712 CDA747    00521         CALL    GTINT
4715 7B        00522         LD      A,E
4716 B7        00523         OR      A
4717 C23343    00524         JP      NZ,GAME
471A C37341    00525         JP      41730
471D 060B      00526 SP11    LD      B,0BH
471F 3E20      00527 SP11L   LD      A,20H
4721 CD3A03    00528         CALL    33AH
4724 10F9      00529         DJNZ    SP11L
4726 C9        00530         RET
4727 3E0D      00531 CLRL    LD      A,0DH
4729 C33A03    00532         JP      33AH
472C AF        00533 BGAD    XOR     A
472D 0607      00534         LD      B,7
472F 86        00535 EG0     ADD     A,(HL)
4730 23        00536         INC     HL
4731 10FC      00537         DJNZ    EG0
4733 C9        00538         RET
4734 013E3E    00539 SPEEHL  LD      BC,3EE0H
4737 ED432040  00540         LD      (4020H),BC
473B CDA728    00541         CALL    28A7H
473E 010000    00542 DELAY   LD      BC,0
4741 C36000    00543         JP      60H
4744 E5        00544 WNU     PUSH    HL
4745 D5        00545         PUSH    DE
4746 C5        00546         PUSH    BC
```

Listing 2 continues

TRS-80™ by RADIO SHACK

PURE RADIO SHACK EQUIPMENT

TRS-80 COLOR COMPUTER

BUY DIRECT PRICED FROM **$309**

TRS-80 MODEL II COMPUTER

BUY DIRECT PRICED FROM **$3098**

TRS-80 MODEL III COMPUTER

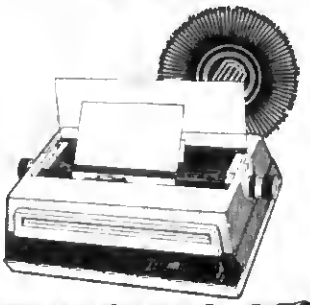
BUY DIRECT PRICED FROM **$609**

TRS-80 MODEL 16 COMPUTER

BUY DIRECT PRICED FROM **$4158**

BUY DIRECT SAVE LOW DISCOUNT PRICES

SMITH CORONA TP-1 DAISY WHEEL PRINTER



LIST $895.00

$695

We carry the full line of **TRS-80** Products manufactured by Radio Shack at **Discount Prices.**

- Printers
- Drives
- Modems
- Software
- Furniture
- Supplies

WRITE FOR YOUR FREE CATALOG

Centranics 739-1 **$499**

VIC-20 **$249**

WE ARE THE BEST IN THE U.S.

MICRO MANAGEMENT SYSTEMS, INC.

Parcel Division - DEPT NO. 4
2803 Thomasville Rd. East
Cairo, Georgia 31728
GA. & INFO 912-377-7120

TOLL FREE 1-800-841-0860

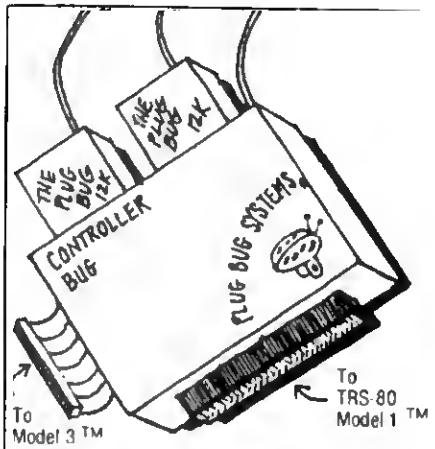
Learn To Do-It-Yourself And **Save Money**

TM-Tandy Corp. Free copy of warranty upon request

Thousands of Satisfied Customers Since '78

96

See List of Advertisers on page 338



PROM Storage Alternative to Tapes and Discs

Need reliable turn-key operation for your TRS-80*?

Can't afford tape/disc problems?

Plug Bug Systems has the cure!

15 day money back guarantee

THE IDEA

A Modularized REPROGRAMMABLE EPROM** memory system for user creation of up to 24K "burned" in BASIC or MACHINE LANGUAGE programs, instantly accessible without tapes or discs, for Model I and III. 48K options available. No soldering or EPROM handling, all units have their own power supplies!

THE SYSTEM

A CONTROLLER MODULE is plugged into the TRS 80* Individual "unburned" 12K or 6K EPROM memory packs are then plugged into the controller. Under direction of our system software, the user loads his target program and "burns" it into 1 or 2 packs, thus providing up to 24K storage. The CONTROLLER MODULE also provides the interface for transferring the "burned" programs or data into RAM avoiding tape and disc load errors! BASIC and MACHINE LANGUAGE programs/data can be called up by file name and start executing immediately. Disc and cassette functions still valid.

OR

Programs can be executed directly from a pack without the CONTROLLER MODULE by plugging them into the TRS 80* (Model I 16K, 32K) keyboard connector bus.

SYSTEM SUPPORT

Plug Bug RAM

6K static read/write memory for program development includes a write protect switch, thereby simulating EPROMs. Programs executed directly or accessed via CONTROLLER MODULE.

Software

PREBURN cassette system control program supervises burn, verify and filespec naming of programs. Can be transferred to disc.

Documentation

Complete, straightforward instructions. Machine language knowledge not required.

Burn Service

We provide a reprogramming service for your Plug Bug packs (non disclosure agreement provided).

PLUG BUG PACKS

6K (EPROM)	$84.95
12K (EPROM)	$94.95
48K (EPROM SYSTEM)	INQUIRE
6K (RAM)	$94.95
CONTROLLER MODULE	$119.50
"BURN" SERVICE PACK	$14.95

To order, send cashiers check or money order to

PLUG BUG SYSTEMS

RFD 3, Box 300
Mt Kisco, N.Y. 10549
914-666 7672
C.O.D. on request
add $3.00 for shipping and handling
add $5.00 for Canada and Mexico
*Trade Mark Tandy Radio Shack Corp
**Packs erasable with ultra-violet lamp

377

Listing 2 continued

```
4747 CD9A8A    00547          CALL    0A9AH
474A 010002    00548          LD      BC,200H
474D C5        00549          PUSH    BC
474E 3E00      00550          LD      A,00H
4750 CDBE0F    00551          CALL    0FBEH
4753 FDE5      00552          PUSH    IY
4755 D1        00553          POP     DE
4756 C1        00554          POP     BC
4757 48        00555          LD      C,B
4758 0600      00556          LD      B,0
475A EDB0      00557          LDIR
475C C1        00558          POP     BC
475D D1        00559          POP     DE
475E E1        00560          POP     HL
475F C9        00561          RET
4760 C5        00562 MVBCHL   PUSH    BC
4761 71        00563 MVB1     LD      (HL),C
4762 23        00564          INC     HL
4763 10FC      00565          DJNZ    MVB1
4765 C1        00566          POP     BC
4766 C9        00567          RET
4767 C631      00568 GPN      ADD     A,'1'
4769 320346    00569          LD      (MS3+7),A
476C 21FC47    00570          LD      HL,MS3
476F CDA728    00571          CALL    28A7H
4772 C3B31B    00572          JP      1BB3H
4775 CD7D47    00573 MVND     CALL    MVN
4778 3E20      00574          LD      A,20H
477A 1B        00575          DEC     DE
477B 12        00576          LD      (DE),A
477C C9        00577          RET
477D 0608      00578 MVN      LD      B,08H
477F 23        00579 MV1      INC     HL
4780 7E        00580          LD      A,(HL)
4781 12        00581 MV2      LD      (DE),A
4782 13        00582          INC     DE
4783 B7        00583          OR      A
4784 C8        00584          RET     Z
4785 10F8      00585          DJNZ    MV1
4787 AF        00586          XOR     A
4788 18F7      00587          JR      MV2
478A 2600      00588 WBINT    LD      H,0
478C CD9A8A    00589 WINT     CALL    0A9AH
478F 010005    00590          LD      BC,500H
4792 3E00      00591          LD      A,00H
4794 CDBE0F    00592          CALL    0FBEH
4797 C3A728    00593          JP      28A7H
479A CD9A8A    00594 RNDM     CALL    0A9AH
479D CDC914    00595          CALL    14C9H
47A0 CD378B    00596          CALL    8B37H
47A3 2A2141    00597          LD      HL,(4121H)
47A6 C9        00598          RET
47A7 CDA728    00599 GTINT    CALL    28A7H
47AA CDB31B    00600          CALL    1BB3H
47AD D7        00601          RST     10H
47AE C35A1E    00602          JP      1E5AH
47B1 00        00603 MODE     DEFB    0
000C           00604 PLY1     DEFS    0CH
000C           00605 PLY2     DEFS    0CH
47CA 00        00606 IQ       DEFB    0
47CB 00        00607 INICTR   DEFB    0
0006           00608 SCORE    DEFS    6
47D2 4B        00609 MS1      DEFM    'K A L A B'
47D8 8C8C      00610          DEFW    0C8CH
47DD 41        00611          DEFM    'AM I PLAYER 1 (1=Y,0=N)'
47F4 00        00612          DEFB    0
47F5 54        00613 MS2      DEFM    'TRS-80'
47FB 00        00614          DEFB    0
47FC 50        00615 MS3      DEFM    'PLAYER X'
4804 00        00616          DEFB    0
4805 48        00617 MS4      DEFM    'HOW SMART AM I (0-'
4817 36        00618          DEFB    '0'+MAXIQ
4818 29        00619          DEFB    ')'
4819 00        00620          DEFB    0
481A 48        00621 MS5      DEFM    'HOW MANY COUNTERS TO START (3-9)'
483A 00        00622          DEFB    0
483B 27        00623 MS6      DEFB    ''
483C 53        00624          DEFM    'S MOVE'
4842 00        00625          DEFB    0
4843 20        00626 MS7      DEFM    ' WINS.'
4849 00        00627          DEFB    0
484A 41        00628 MS8      DEFM    'A TIE.'
4850 00        00629          DEFB    0
4851 47        00630 MS9      DEFM    'GAMES      '
485B 00        00631          DEFB    0
485C 43        00632 MS10     DEFM    'COUNTERS   '
4866 00        00633          DEFB    0
4867 43        00634 MS12     DEFM    'CUMULATIVE'
4871 00        00635          DEFB    0
4872 50        00636 MS11     DEFM    'PLAY AGAIN (1=Y,0=N)'
4886 00        00637          DEFB    0
4887 49        00638 ILGL     DEFM    'ILLEGAL MOVE'
4893 00        00639          DEFB    0
4894 43        00640 CAPT     DEFM    'CAPTURE!'
489C 00        00641          DEFB    0
489D 46        00642 FTRN     DEFM    'FREE TURN!'
48A7 00        00643          DEFB    0
48A8           00644 BOARDS   DEFL    $
42E9           00645          END     START
```

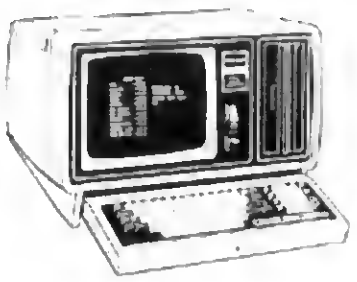
AT LAST!
A PROFESSIONAL JOURNAL FOR ENGINEERS SCIENTISTS MATHEMATICIANS & STATISTICIANS USING MICROCOMPUTERS.
PLUG INTO...
ACCESS!
The Journal of Microcomputer Applications for

* numerical analysis
* math modeling
* statistical analysis
* computerized design
* process simu'ation
* report generation

The articles in ACCESS are written by working engineers and scientists who share their knowledge of how to make productive use of microcomputers with you. Your subscription to ACCESS will make your microcomputer more useful in all areas where engineers and scientists use microcomputers. And you'll even find ways to use your computer you hadn't thought of. The articles in ACCESS are written with you in mind and are aimed at helping you turn your microcomputer into the most productive tool possible. Sign up NOW be a charter subscriber. Join the other engineers and scientists who make ACCESS their source of information on microcomputer applications. Charter rates are 6 issues for $16. (Canada & Mexico $20. Other $32). Fill out the coupon below TODAY. Send check, money order, purchase order, or use your VISA or MASTER CARD.

()Sign me up. $16 () enclosed () Bill me () Bill ↙155
Company Charge VISA () MC #
Exp () Send sample issue here's $3
Name & address
City State and ZIP

Mail to ACCESS PO Box 12847 Research Triangle Park, NC 27709 Published by LEDS Publishing Co., Inc.



MODEL II USERS

TIRED OF WAITING FOR DISK FORMATS AND BACKUPS?

FASTFMT formats and verifies a disk in 43 seconds. TRSDOS[1] FORMAT takes 2½ minutes.

FASTBAK copies and verifies a full disk in 59 seconds (2 drives). TRSDOS BACKUP takes 8 minutes.

These utilities make everday data backups a snap and are distributed on an 8" TRSDOS diskette for systems with 1 or more drives.

$99.95 plus $2.00 shipping VISA MC

CP/M[2] SOFTWARE FOR THE MODEL II

Run Model II BASIC and VisiCalc[3] under CP/M.

Use the Magic Wand[4] word processor with the Daisy II printer — bidirectional printing, justified proportional spacing, more

Make fast backups of your P&T and ATON system disks.

Write or phone for details.

[1]TRSDOS is a trademark of the Tandy Corp
[2]CP/M is a trademark of Digital Research
[3]VisiCalc is a trademark of VisiCorp
[4]Magic Wand is a trademark of Peachtree Software

The MicroProgrammers
5629 University Way NE
Seattle, WA 98105
(206) 525-1466

Computer Case Company

AN OPEN AND SHUT CASE FOR COMPUTERS

Your sizable investment in your computer should be protected. If you have to load and unload your computer every time you want to move it, you must consider the possible damage. Computer Case Company has solved your computer protection problem. Once your equipment is safely inside the attache-style carrying case, it never has to be taken out again. Simply remove the lid, connect the power, and operate. For storage, disconnect the power, enclose your disks, working papers, and manuals in the compartments provided, and attach the lid. Case closed. Judge for yourself.

CALL TOLL FREE: (800) 848-7548

● RS201	TRS-80 Model I, Expansion Unit & Drives	$109
● RS202	TRS-80 Monitor or TV set	84
● RS204	TRS-80 Model III	129
● RS205	Radio Shack Color Computer	89
● P401	Paper Tiger 440/445/460	99
● P402	Line Printer II/IV	89
● P403	Epson MX70, MX80 or IBM Matrix	89
● P404	Epson MX100	99
● CC80	Matching Attaché Case (5")	85
● CC90	Matching Attaché Case (3")	75
● CC91	Matching Accessory Case	95

↙139

5650 Indian Mound Court • Columbus, Ohio 43213 • (614) 868-9464

↙See List of Advertisers on page 338

DISPLAYED VIDEO'S DONE IT AGAIN!!!

"DV'S" COLOR COMPUTER FIRST DRIVE "$425.00"

"PRICE" "CUT"

DISPLAYED VIDEO IS DRIVING DOWN PRICES ON DISKS!

"PRICE" "CUT"

80 TRACK TEAC DISK DRIVE W/CASE & POWER SUPPLY*

$289.00

40 TRACK TEAC DISK DRIVE W/CASE & POWER SUPPLY

$239.00

TWO DRIVE CABLE $23.99

With Gold Plated Connectors

NEWDOS 80 $125.00 MODEL I OR III

Bare Drives & Cases Available Upon Request

By the time you see this ad, DISPLAYED VIDEO's *Hard Disk* will be available to you.
Call for the Lowest Prices Available

EPSON PRICES

We're not going to make you call for prices.
Here they are in black and white!!

MX 80 (W/GRAPHTRAX) PLUS $459.00

MX80FT (W/GRAPHTRAX) PLUS $565.00

MX100 (W/GRAPHTRAX) PLUS $719.00

PRINTER CABLE $23.99

With Gold Plated Connectors
We Carry A Full Line of OKIDATA Printers

1 YEAR WARRANTY!
1 YEAR WARRANTY!
FREE SHIPPING!

COUPON

Stop In to our Two New Retail Locations:
886 Ecorse Road, Ypsilanti, MI 48197
(313) 426-5086/ (313) 482-4424
or
111 Marshall Street, Litchfield, MI 49252
(517) 542-3280
And Present this ***COUPON*** *to pick up your free* ***Diskette*** *or* ***Two C10 Cassettes.***

Limit one per family.
Offers expires 9 1 82

DISPLAYED VIDEO

IMMEDIATE DELIVERY
90 Days Parts and Labor Warranty
DEALER INQUIRIES INVITED

Free Shipping in the U.S. 48 Contiguous States

Grand Opening of our Radio Shack Authorized Dealership at:
111 Marshall Street, Litchfield, Michigan 49252 *•P142*

To Order: Call (313) 426-5086 or (313) 482-4424 or (517) 542-3280 or write DISPLAYED VIDEO.
886 Ecorse Road, Ypsilanti, Michigan 48197

*TRS-80 is a trademark of the Tandy Corporation

Prices subject to change without notice

COUPON

DISPLAYED VIDEO IS DRIVING DOWN PRICES ON DISKS!

DISPLAYED VIDEO is now offering TRS-80* MODEL III with TANDON disk drives, one of the most reliable disk drive systems on the market, for incredibly low prices.

MODEL III with 48K, dual 40 track double density disk drives, complete systems with TRSDOS and ONE BOX OF DISKETTES

PLUG IT IN AND GO. **$1,799.00**

MODEL III with 48K, dual 40/40 track double density disk drives, complete systems with NEWDOS 80 and ONE BOX OF DISKETTES

PLUG IT IN AND GO. **$2,199.00**

MODEL III with 48K, dual 80 track double density disk drives, complete systems with NEWDOS 80 and ONE BOX OF DISKETTES

PLUG IT IN AND GO. **$2,199.00**

MODEL III with 48K, dual 80/80 track double density disk drives, complete systems with NEWDOS 80 and ONE BOX OF DISKETTES

PLUG IT IN AND GO. **$2,499.00**

MODEL III 16K w/Free Shipping. **$839.00**
16K Color Computer. **$459.00**
MODEL III Internal Drive Kit. Includes controller board, dual drive mounting bracket, dual power supply, all hardware cables and connectors (gold plated) **$399.00**
MODEL 16 w/1 drive /w/2 drives . . . . . **CALL**

120 DAY WARRANTY!!

FREE SHIPPING!!

Visit Our Two NEW RETAIL LOCATIONS:

886 Ecorse Road, Ypsilanti, MI 48197
(313) 426-5086 (313) 482-4424

111 Marshall Street, Litchfield, MI 49252
(517) 542-3280

DISPLAYED VIDEO

IMMEDIATE DELIVERY
120 Days Parts and Labor Warranty
DEALER INQUIRIES INVITED
Free Shipping in the U.S. 48 Contiguous States

Grand Opening of our Radio Shack Authorized Dealership at:
111 Marshall Street, Litchfield, Michigan 49252 ***#P142***

To Order: Call (313) 426-5086 or (313) 482-4424 or (517) 542-3280 or write DISPLAYED VIDEO, 886 Ecorse Road, Ypsilanti, Michigan 48197

*TRS-80 is a trademark of the Tandy Corporation

Prices subject to change without notice

LOAD 80

Board games redone for your 80.

Tee for Six

Carl Bevington
1857 East Third Street
Salem, OH 44460

Many of us have played a game on a small triangular piece of wood with ten drilled holes and nine pegs. To play the game you capture tees by jumping adjacent tees to unoccupied positions along a straight line. You can remove all but one tee this way. The game ends when only one tee remains. This simple board game inspired the program for Triangle Marker.

Before writing the program, I analyzed the game board to determine what moves are possible, how moves are entered and shown and what makes a win.

Another version of the board game uses 15 rather than 10 tees. To make the game more challenging I used 15 tees numbering the board positions consecutively. This numbering system is important in later program logic.

Next I compiled a list of possible moves on the board (see Fig. 1). For example, marker one can move to positions four or six, while marker four can move to positions one, six, 11, or 13. The player enters single numbers to move. The first two digits represent the position moved from and the last two digits represent the position moved to. A move from 13 to 15 is coded 1315. A move from 11 to four is coded 1104, but a move from four to 11 is coded 411. The computer requires no leading zero.

The first 36 data numbers in line 770 of Program Listing 1 are the codes of 36 possible moves on the game board. Line 200 reads and stores possible moves in M(1) through M(36). The program breaks the possible move codes so the first two digits stored in F(I) code the position moved from and the last two digits stored in T(I) code the position moved to.

The computer reads in the data while the user reads playing instructions.

Entering and Showing Moves

Line 200 reads the 15 "print at" positions for the markers on the screen and stores them in P(1) through P(15). Lines 240 -270 provide the playing board graphics. Line 290 puts a 1 in L(1), a 2 in L(2), a 3 in L(3), . . . , and a 15 in L(15). These variable locations determine board position vacancies. For example, when you remove marker 13 from the game board, L(13) will be set to zero. Board positions whose L( ) value is zero are vacant while those whose L( ) value is non-zero are occupied. In line 210, M$ is the graphics design for the individual marker and B$ removes the marker graphics from the video screen.

The user inputs moves with INKEY$ but some positions on the screen are coded by a single-

The Key Box

Basic Level II
Model I or III

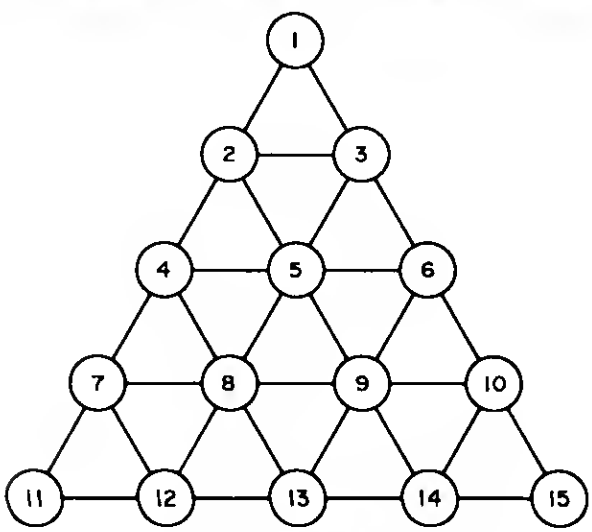


Fig. 1. Triangle Marker

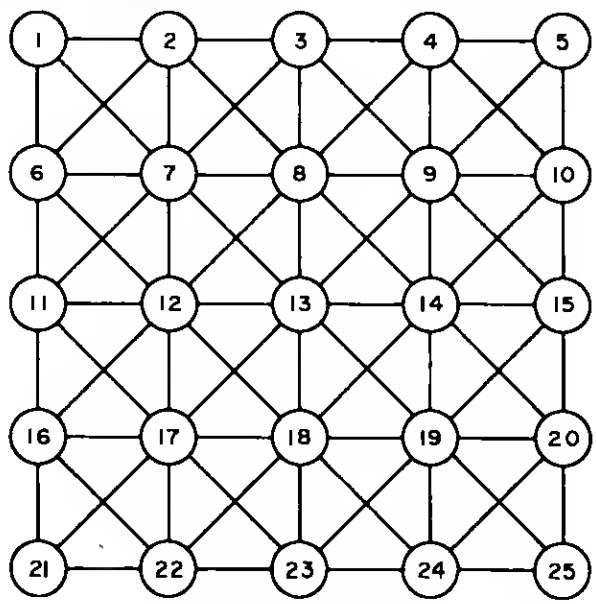


Fig. 2. Square Marker

After three years of selling my Model I and Model III programs, I've earned back my development costs.

So I can lower the price.

Now I'm offering my Model I and Model III programs for $75 each.

They've been checked out by thousands of TRS-80* users, most of whom get in touch with me, Irwin Taranto. Thousands of phone calls later, these systems are completely developed, checked out, glitch-free.

When people call, we've heard all the questions and we can answer them right off. I don't have to get on the phone and work through problems like I used to.

Since I'm getting off so easy, the least I can do is drop the price—50% for General Ledger, 25% for the rest.

These are my Model I and Model III programs:

Accounts Payable It links to the General Ledger, calculates and prints checks and makes reports. It's an invoice-linked system.

Accounts Receivable It keeps track of billed and unbilled invoices, open and closed items and aging. It prints statements and links to the General Ledger.

General Ledger It keeps track of time by month, quarter, year and the previous three quarters. It even includes a Cash Journal.

Inventory Control It gives an immediate read-out on any item inquiry, including quantity and dollar total.

Invoicing It prints your detailed invoices and links to Accounts Receivable and the General Ledger.

Payroll It keeps the files, computes pay and deductions, prints forms and checks, figures taxes, overtime and piecework pay in any state tax routine, and prints the 941-A and W-2 forms.

They're all yours, for $75 each. You also need documentation when you run our systems. The Osborne books—one for Accounts Payable and Receivabla, one for General Ledger, one for Payroll—cost $20 each. Our invoicing book costs $10.

Just send me the coupon, or call us toll free. We'll ship within 48 hours.

Please send me the following programs at $75 each:

		book ☑
Accounts Payable		
Accounts Receivable		
General Ledger		
Inventory Control		
Invoicing		
Payroll		
Add $4.50 per order for handling		
6% tax (California only)		
AMOUNT ENCLOSED		

If you need the books, add $20 each. The invoicing book is $10.

Mastercharge ☐ Visa ☐ No. _____ Expires ____

☐ Please send me information on other Taranto business programs, including TRS-80 Model II accounting systems.

Your name _____

Company name _____

Address _____

City/State/Zip _____

Taranto
& ASSOCIATES, INC.

70

The Total System Store, 121 Paul Drive, San Rafael, CA 94903. Outside California, toll free (800) 227-2868. In California, (415) 472-2670.

*A trademark of the Tandy Corporation

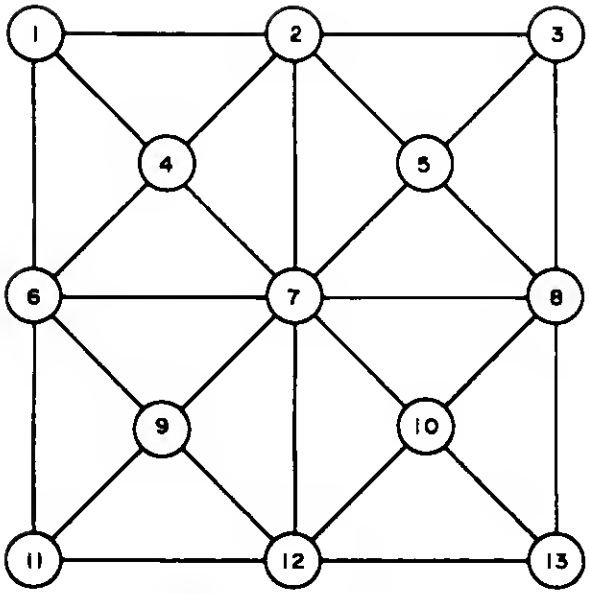


Fig. 3a. Lucky 13 Marker

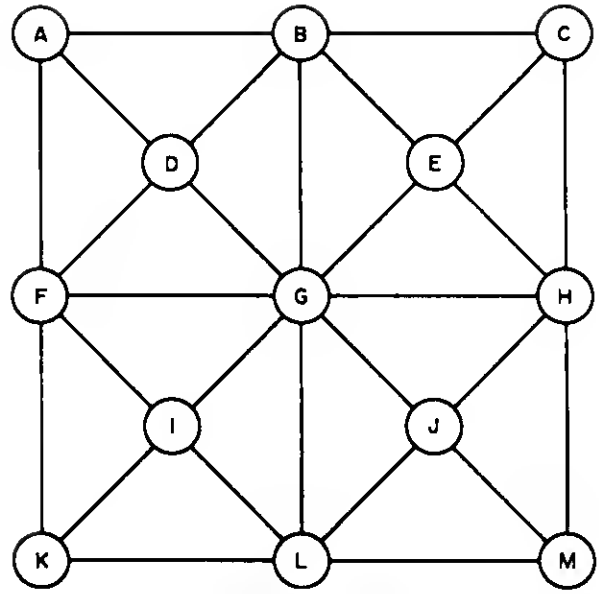


Fig. 3b. Lucky 13 Marker

digit number and some are coded by a two-digit number. I changed the code numbers for the positions from one through 15 to 10 through 24. The program subtracts nine from the number input so the program logic previously developed can still be used.

To begin the game, the routine in lines 290–340 permits the user to leave any of the 15 board positions vacant. F$ is the first digit of the input, S$ is the second digit of the input, and PP is the full position number in the original numbering system of one through 15.

Lines 360–430 code and enter the move from and the move to two-digit numbers input using INKEY$. Lines 450–540 determine if the user's move is possible and which marker is removed by the given jump.

Using the numbering system for the positions shown in Fig. 1, if the user jumps from two to nine, the five marker is removed. If the user jumps from 12 to five, the eight marker is removed. In both cases, if the position moved from is added to the position moved to, the sum divided by two, and the INT function taken of the quotient, the result is the number of the captured marker. This works no matter where the move is on the game board. Consequently, line 510 determines the marker you remove.

When a move is entered and checked, the subroutine in lines 570–630 positions the markers on the video screen. With C as a counter, the routine in lines 570–600 is used twice when two markers are removed, the position marker moved from and the position marker jumped.

Lines 650–700 check for remaining possible moves. When additional moves are possible, the program passes to line 360 where the user may enter additional moves. Lines 710–730 count the number of remaining markers. If no more moves are possible and more than one marker remains on the game board, line 750 provides a "No Possible Move" message; if only one marker remains on the game board, line 760 provides a "You Are A Winner" message. In both cases, the program passes to line 240 to begin a new game.

Square

Triangle fanned my curiosity about such games.

I analyzed a square game board to determine what moves are possible, how moves are entered and shown and when the game is won.

I numbered the game board positions consecutively; again, this particular numbering system proved worthwhile in the program logic. (See Fig. 2.)

I compiled a list of the possible moves. The coding for the moves in the Triangle Marker Game worked well, so I used the same procedure in Square Marker. The first two digits of a number represent the position moved from and the last two digits represent the position moved to.

There are 96 possible moves on the square game board; their respective codes are in the 96 data numbers in lines 760–780 of Program Listing 2. Line 200 reads

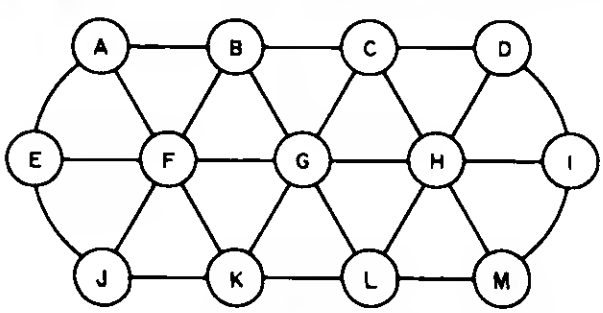


Fig. 5. Star Marker

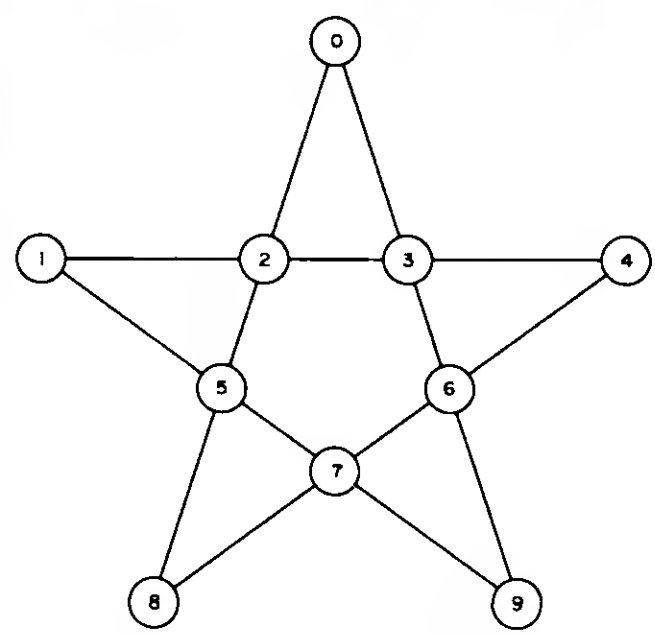


Fig. 4. 'Round the End Marker

SPECIALS

List
$29.95 ea.
SPECIAL
$19.95 ea.
Final Month

TRSDOS™ COMMENTED ★NEW★ by Soft Sector Marketing, Inc. This is the most complete manual on any operating system ever published. A complete listing of all the system files and comments on every one in the MOD III Radio Shack TRSDOS operating system. Detailed comments on things like Format and Back-up. This is the second in a series of books detailing the Model III computer. Over 10 months of research in the writing of this book. Over 250 pages of complete information. The only thing not covered by this book and the MOD III Rom Commented book is Disk BASIC.

List
$22.50 ea.
SPECIAL
$19.95 ea.

MOD III ROM COMMENTED by Soft Sector Marketing, Inc. Do you reap only mysteries from your TRS-80 ROMs? Your book has arrived! NOT just a rehash of old information, not an instruction course on machine language, but rather an information source that you can use time and time again for writing your own programs. It contains detailed comments and an explanation of ROMs in the latest machine from Tandy, with most every location of the 14K ROMs listed with comments.

SO, you thought you were getting a bargain when you purchased your MX-70/80 Reload Ribbon . .

THEN YOU GOT IT, AND . .

WHAT A MESS!

GET A REAL BARGAIN!
Purchase ONE
Epson Replacement Cartridge at
$15.00 and get ONE FREE!
LIMITED TIME OFFER, SO HURRY.
Offer expires when supplies are gone

– DEALER INQUIRIES WELCOME –

SSM SOFT SECTOR MARKETING, INCORPORATED
6250 Middlebelt • Garden City, Michigan 48135
Order Line **800-521-6504**
Michigan Orders & Questions 313-425-4020

PAYMENT– payment accepted by charge, personal or C.O.D. only under the following conditions. Charges processed when shipped, usually within 48 hours. Personal Checks delay shipping pending 3 weeks clearance. C.O.D. orders are certified check or cash only – add $1.50. All residents must add 4% sales tax. **SHIPPING & HANDLING – Shipping Charges:** Send the larger amount if in doubt. Excess will be refunded unless stipulated otherwise. Any order received without shipping and handling charges will be shipped freight collect. **Air Mail Shipping** outside of North America, please send $3.00. Overpayment will be refunded.

✓See List of Advertisers on page 338

the codes for the possible moves and stores them in M(1) through M(96). The program breaks the possible move codes and stores the first two digits in F(I) as the position moved from and the last two digits in T(I) as the position moved to.

Winning

Lines 560–610 check for additional possible moves. The program passes to line 320 where the user may enter additional moves. Lines 630–650 count the number of markers remaining on the board. If more than one marker remains and no more moves are possible, line 660 provides a "No Possible Move" message. If only one marker remains on the game board, line 690 provides a "You Are A Winner" message. In both cases the program passes to line 720 for another game.

Lucky 13

Fig. 3a shows the position of the 13 markers in this game. There are 32 possible moves; the first 32 data numbers in line 800 of Program Listing 3 give their respective codes. Instead of referring to the marker positions on the video by the coding in Fig. 3a, the positions are labeled as in Fig. 3b and INKEY$ is used for input.

The ASC function in lines 350, 420, and 460 of Listing 3 converts the alphabetic coding of Fig. 3b to the numerical coding of Fig. 3a for the program logic. As in the other games, the marker to be jumped can be determined by adding the position moved from to the position moved to and dividing the result by two.

'Round the End

Fig. 4 shows the thirteen markers used in this game. The codes of the 38 possible moves are in line 110 of Program Listing 4. The marker positions are similar to Fig. 4 and INKEY$ is used for input. The ASC function in lines 350, 390, and 410 converts alphabetic coding to the numerical coding the program logic requires.

Deciding which marker to jump is more complicated; checking for remaining moves involves more possibilities.

The computer reads in the data while the user reads playing instructions.

Entering and Showing Moves

Line 200 reads the 25 "print at" positions for the markers on the video screen and stores them in P(1) through P(25). Lines 240–260 provide the playing board graphics on the video screen. Line 270 puts a 1 in L(1), a 2 in L(2), a 3 in L(3), . . . , and a 25 in L(25), providing a method to determine board position vacancies. Positions whose L( ) value is zero are vacant, while positions whose L( ) value is non-zero are occupied. In line 200, M$ is the graphics design for the individual marker and B$ is the blanking needed to remove the marker graphics from the video screen.

Having used the INKEY$ function for user input in Triangle Marker, I decided to use the input function on Square Marker.

To begin, the routine in lines 290–300 permits the player to leave any of the 25 positions vacant. Line 320 provides input for individual moves. Lines 350–440 determine if the player's move is possible and which marker is captured by the given jump.

Using the numbering system for the positions shown in Fig. 2, if the user jumps from 17 to nine, the 13 marker must be removed. If the user jumps from six to 16, the 11 marker must be removed. In both cases, if the position moved from is added to the position moved to and the sum then divided by two, the result is the number of the captured marker. This particular process works no matter where the move is on the game board. Line 420 determines the marker to be removed.

When a move is entered and checked, the subroutine in lines 480–540 positions the markers on the video screen. With C as a counter, the routine in lines 480–510 is used twice when two markers are captured.

Star Marker

Fig. 5 shows the 10 markers in this game. There are 20 possible moves; their respective codes are in the first 20 data numbers in line 220 of Program Listing 5. The graphics for Star Marker in lines 220–310 are extensive. While determining which marker to capture is relatively simple,

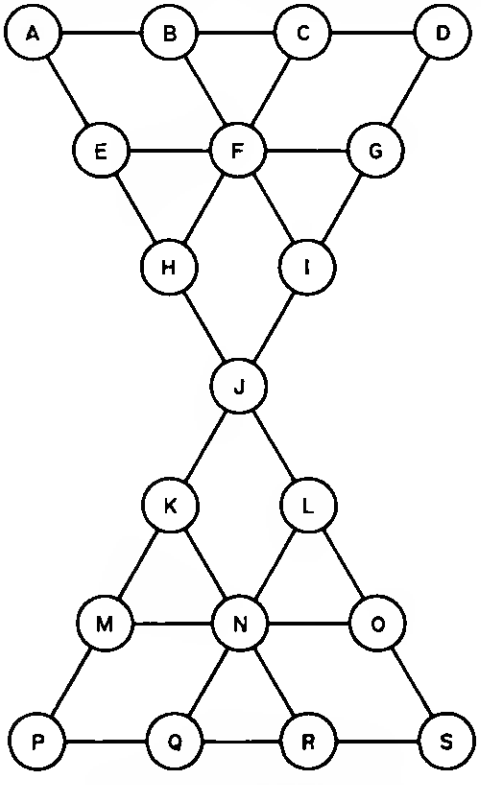
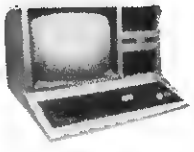


Fig. 6. Double Triangle Merker



Just between you and us. . .
We think we've got
THE BEST
TRS-80* MODEL III
Disk System around!

***WHY?* Here's three good reasons.**

1. VERSATILITY

Our own proven, dependable drive controller board will give you the hardware to run almost any drive configuration you can imagine:

- 5¼" and 8" drives in any combination.
- Internal/external combinations (up to all 4 drives external).
- Single- and dual-headed drive combinations.

2. QUALITY

- We chose MPI drives—*the long-time leaders in the field*
- We construct our own disk drive installation kits of heavy gauge steel—no *shielding problems!*
- We designed independently regulated linear power supplies—*fast and reliable.*

3. PRICE (including installation & 90-day warranty)

- Drive controller board and first drive $679
- Second (internal) drive $279
- Third drive (with cable) $359
- Fourth drive $329

If these sound like really good deals but you don't have the Model III yet, we've got the answer.

A TRS-80 Model III, 48K, TRSDOS, 2 MPI drives $1B99
— Fully tested with 90-day warranty —

Dollar-for-dollar, we think this is the **BEST** *TRS-80 system you can buy!!*

We also stock for immediate shipment:
MODEL III, 32K $899

EPSON Printers, accessories & interfaces at Low, Low Prices

We Now Accept Visa & Mastercard

*TRS-80 is a Trademark of Tandy Corp.

NEW LOCATION ✓288

PROCESS CONTROL TECHNOLOGY

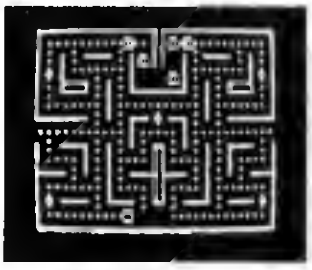
8030 Lorraine Ave., Suite 328 • Stockton, California 95210 • (209) 952-6576

SAVE 10%

ARCADE CENTER

ALIEN DEFENSE
1981 Soft Sector Marketing, Inc.
Mod I & III Tape **$15.95**
Mod I & III Disk* **$19.95**
Disk Version Talks!

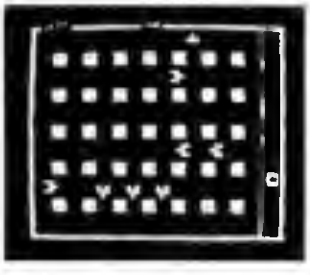
SUPER VADERS
*1981 Soft Sector Marketing, Inc
Mod I & III Tape **$15.95**
Mod I & III Disk **$19.95**
– 2 Player - 10 Levels –



SCARFMAN
*1981 Cornsoft Group
Mod I & III Tape **$15.95**
Mod I & III Disk* **$19.95**

ROBOT ATTACK
by Big 5
Mod I & III Tape **$15.95**
Mod I & III Disk* **$19.95**

SPACE CASTLE
by Cornsoft Group
Mod I & III Tape **$15.95**
Mod I & III Disk **$19.95**



ATTACK FORCE
by Big 5
Mod I & II Tape **$15.95**
Mod I & III Disk* **$19.95**

GALAXY INVASION
by Big 5
Mod I & III Tape **$15.95**
Mod I & III Disk* **$19.95**

NEW

DEFENSE COMMAND
by Big 5
Mod I & III Tape
$15.95
Mod I & II Disk
$19.95

METEOR MISSION 2
by Big 5
Mod I & III Tape **$15.95**
Mod I & III Disk* **$19.95**

VOYAGE OF VALKYRIE
by Leo Christopherson
Mod I & III Tape **$34.95**
Mod I & III Disk **$39.95**

80 SPACE RAIDERS
by Bosen Electronics
Mod I & III Tape
$24.95

CATERPILLAR
*1982 Soft Sector Marketing, Inc
Mod I & III Tape **$15.95**
Mod I & III Disk **$19.95**

*These versions save high score to disk

SPECIAL DEAL – This Month Only
Purchase 1 Game - List Price / Purchase 2 Games - Deduct 10%
Purchase 3 Games - Deduct 15% / Purchase 5 Games - Deduct 20%
– SPECIAL DEAL applies only to games purchased at one time, and at list price –

– DEALER INQUIRIES WELCOME –

84

SSM SOFT SECTOR MARKETING, INCORPORATED
6250 Middlebelt • Garden City, Michigan 48135
Order Line **800-521-6504**
Michigan Orders & Questions 313-425-4020

VISA MasterCard

PAYMENT – payment accepted by charge, personal check or C.O.D. only, under the following conditions: **Charges** processed when shipped (usually within 48 hours). **Personal Checks** delay shipping, pending 3-weeks to clear. **C.O.D.** orders are certified check or cash only, add $1.50. MI residents must add 4% sales tax. **SHIPPING & HANDLING – Shipping Charges:** Send the larger amount: 2% or $2.50 unless stipulated otherwise. Any order received without shipping and handling will be shipped **freight collect**. **Air Mail Shipping** outside of North America, please send the larger amount: 10% or $10.00. Overpayment will be refunded.

The Quality Continues

See List of Advertisers on page 338

checking for possible remaining moves is now quite complicated.

Double Triangle

Fig. 6 shows the 19 markers used in this game. There are 42 possible moves; their codes are in line 860 of Program Listing 6. The marker captured in each of the 42 possible jumps is determined in lines 250–280 and stored in J(1) through J(42). ■

Program Listing 1

```
100 '     OPENING GRAPEICS AND CREDITS                :DEFINTA-Z
110 CLS:PRINTCER$(23):FORX=0TO126STEP2:SET(X,0):SET(X,1):SET(X,1
9):SET(X,20):SET(X,46):SET(X,47):NEXTX:FORY=3TO17STEP2:SET(0,Y):
SET(1,Y):SET(121,Y):SET(124,Y):NEXTY:FORY=22TO45STEP2:SET(0,Y):S
ET(1,Y):SET(121,Y):SET(124,Y):NEXTY:N$="TRIANGLE MARKER GAME"
120 PRINT@586,"PROGRAM DESIGNED BY";:PRINT@714,"CARL a. bEVINGTO
N";:PRINT@778,"1857 EAST THIRD STREET";:PRINT@842,"SALEM, OHIO
  44460";:FORI=1TO5:PRINT@282,"                              ";:FORQ=1TO5
0:NEXTQ:PRINT@282,N$;:FORQ=1TO480:NEXTQ,I
130 '     GRAPHICS FOR DIRCTIONS
140 CLS:FORX=16TO25:SET(X,0):SET(X-4,4):SET(X+4,4):SET(X-8,8):SE
T(X,8):SET(X+8,8):SET(X-12,12):SET(X-4,12):SET(X+4,12):SET(X+12,
12):SET(X-16,16):SET(X-8,16):SET(X,16):SET(X+8,16):SET(X+16,16):
SET(X-16,28):SET(X-8,28):SET(X,28):SET(X+8,28):SET(X+16,28):NEXT
X
150 FORY=16TO8STEP-4:FORX=YTO40-YSTEP4:SET(X,16-Y):SET(X+1,18-Y)
:NEXTM,Y:FORY=16TO8STEP-4:FORX=YTO40-YSTEP8:SET(X,17-Y):SET(X+1,
17-Y):SET(X,19-Y):SET(X+1,19-Y):NEXTX,Y
160 '     TEXT OF DIRECTIONS FOR PLAYING GAME
170 PRINT@36,"DIRECTIONS";:PRINT@152,"THE GAME IS BEGUN BY HAVIN
G MARKERS ON";:PRINT@216,"ALL OF THE CELLS BUT ONE.  THE OBJECT
OF";:PRINT@280,"THE GAME IS TO REMOVE AS MANY OF THE";:PRINT@344
,"MARKERS AS POSSIBLE BY JUMPING OVER ONE";
180 PRINT@488,"ADJACENT MARKER ALONG A STRAIGHT LINE";:PRINT@472
,"TO A VACANT CELL.  THE JUMPED MARKER IS";:PRINT"REMOVED FROM TH
E BOARD.  ALL MARKERS BUT ONE CAN BE REMOVED";:PRINT"IN THIS MANN
ER WITH THE GOAL BEING TO END THE GAME WITH ONE"
190 PRINT"MARKER REMAINING ON THE BOARD.  YOU WILL BEGIN BY TELL
ING THE";:PRINT"COMPUTER WHICH CELL SHOULD BE LEFT VACANT AND THE
N ENTERING";:PRINT"MOVES TO JUMP OVER THE REMAINING MARKERS.  ";
200 DIMP(15),L(15),N(36),F(36),T(36):FORI=1TO36:READM(I):F(I)=IN
T(M(I)/100):T(I)=M(I)-100*F(I):NEXTI:FORI=1TO15:READP(I):NEXTI
210 PRINT"DO NOT USE THE ENTER KEY FOR INPUT OF MOVES.          >>PR
ESS THE SPACE BAR TO CONTINUE<<";M$=CHR$(164)+CHR$(180):B$="   "

220 W$=INKEY$:IFW$=" "THEN240ELSE220
230 '     GRAPHICS FOR GAME
240 CLS:PRINT@26,"0";:PRINT@213,11;:PRINT@223,12;:PRINT@489,13;:P
RINT@418,14;:PRINT@428,15;:PRINT@587,16;:PRINT@597,17;:PRINT@607
,18;:PRINT@617,19;:PRINT@774,20;:PRINT@784,21;:PRINT@794,22;:PRI
NT@804,23;:PRINT@814,24;
250 M=18:N=98:P=43:FORT=1TO5:FORX=NTONSTEP20:FORX1=@TO11:SET(X+X
1,P):SET(X+X1,P-5):NEXTM1,X:N=N+10:N=N-18:P=P-9:NEXTY
260 N=18:N=98:FORY=42TO6STEP-9:FORX=MTONSTEP20:FORYI=@TO3:SET(X,
Y-Y1):SET(X+1,Y-Y1):SET(X+10,Y-Y1):SET(X+11,Y-Y1):NEXTY1,X:M=M+1
0:N=N-18:NEXTX
270 PRINT@95,M$;:PRINT@282,M$;:PRINT@292,M$;:PRINT@469,M$;:PRINT
@479,M$;:PRINT@489,M$;:PRINT@656,M$;:PRINT@666,M$;:PRINT@676,M$;
:PRINT@686,M$;:PRINT@843,N$;:PRINT@853,N$;:PRINT@863,N$;:PRINT@8
73,N$;:PRINT@883,M$;
280 '     VACANT POSITION SET TO BEGIN GAME
290 FORI=1TO15:L(I)=I:NEXTI:PRINT@64,"WHICH POSITION VACANT?";
300 F$=INKEY$:IFF$=""THEN300ELSE310
310 PRINT@66,F$;:S$=INKEY$:IFS$=""THEN310ELSE320
320 PRINT@89,S$;:FP=VAL(F$+S$)-9:FORQ=1TO180:NEXTQ
330 PRINT@64,"                                ";
340 C=2:L(FP)=0:H=0:G=FP:GOSUB570
350 '     INPUT FOR MOVES
360 PRINT@65,"FROM?  ";
370 FF$=INKEY$:IFFF$=""THEN370ELSE380
380 PRINT@72,FF$;:SF$=INKEY$:IFSF$=""THEN380ELSE390
390 PRINT@73,SF$;:NF=VAL(FF$+SF$)-9
400 PRINT@131,"TO?";
410 FT$=INKEY$:IFFT$=""THEN410ELSE420
420 PRINT@136,FT$;:ST$=INKEY$:IFST$=""THEN420ELSE430
430 PRINT@137,ST$;:NT=VAL(FT$+ET$)-9:FORQ=1TO180:NEXTQ:PRINT@65,
"                ";:PRINT@130,"                ";
440 '     CHECK OF POSITIONS FOR MOVES
450 FORI=1TO36
460 IFNF=F(I)ANDMT=T(I)THEN490
470 NEXTI
480 PRINT@65,"TRY AGAIN!";:FORQ=1TO300:NEXTQ:PRINT@65,"
  ";:GOTO350
490 IFL(NT)<>0THEN480
500 IFL(NF)=0THEN480
510 MO=INT((T(I)+F(I))/2)
520 IFL(MO)=0THEN480
530 L(MO)=0:L(MT)=MT:L(NF)=0:G=MO:H=MT:C=1
540 GOSUB570
550 GOTO650
560 '     GRAPHICS FOR MARKERS ON BOARD
570 FORZ=1TO15
580 IFG=ZTHENPRINT@P(Z),B$;
590 IFS=ZTHENPRINT@P(Z),M$;
600 NEXTZ
610 IFC=2THEN630
620 C=2:G=NF:GOTO570
630 RETURN
640 '     CHECK FOR POSSIBLE MOVES REMAINING / END OF GAME / WIN
NING
650 FORI=1TO36
660 IFL(F(I))=0THEN700
670 LETH=INT((F(I)+T(I))/2)
680 IFL(H)<>0ANDL(T(I))=0THEN360
690 IFH<>0ANDT(I)=0THEN360
700 NEXTI
710 L=0:FORI=1TO15
720 IFL(I)=0THEN730ELSEL=L+1
730 NEXTI
740 IFL=1THEN760
750 PRINT@65,"NO POSSIBLE MOVE.";:PRINT@128,ABS(L);"MARKERS REMA
IN.";:FORQ=1TO1500:NEXTQ:PRINT@65,"                ";:PRINT@12
```

Program Listing 1 Continues

PREMIUM CASSETTES

COMPUTER GRADE
100% ERROR-FREE
FULLY GUARANTEED

MANUFACTURER PRICES

The Micro-Trac™ Generation

- High Frequency Response • Wide Dynamic Range
- *Used by Software Firms & Computer Hobbyists*
- Choice of School Districts Nationwide

LENGTH	12-PAK	24-PAK
C-05	$ .69	$ .59
C-10	$ .79	$ .69
C-20	$ .99	$ .89
C-30	$1.19	$1.09
C-60	$1.49	$1.39
C-90	$1.79	$1.69
*CASES	$ .21	$.20

*Cases recommended to protect sensitive cassettes.

—UPS SHIPPING—
(No P.O. Boxes please)
$2.00 (12-pak) $3.00 (24-pak)
—Canadian shipping multiply by 2—

#1 COMPUTER TAPE IN THE USA!

—write for volume prices—

TOLL-FREE
(orders only)
1-800-426-4747
ext. 480
In Washington State
1-800-562-4555
ext. 480

VISA

MICRO-80 ™ INC.

E. 2665 Busby Road
Oak Harbor, WA 98277
—Distributors Wanted—

Circle 85 on Reader Service card.→

Scanned by Ira Goldklang - www.trs-80.com

You Are Being Attacked by a Raging . . .

Caterpillar

DISK VERSION TALKS

JOYSTICK Compatible*

SSM SOFT SECTOR MARKETING, INCORPORATED

6250 Middlebelt • Garden City, MI 48135 • 800-521-6504/(313) 425-4020

Written by Larry Ashmun, Copyright 1982 Soft Sector Marketing, Inc.

Prices per Game: TRS-80 16K Level II Mod I/Mod III Cassette $15.95
TRS-80 32K Level III Mod I/Mod III Diskette $19.95

10% discount for 2 items, 15% for 3 or more. Please add $2.50 per order for postage & handling. Michigan residents add 4% sales tax. Outside USA (except Canada) please add $10.00 per order for postage & handling.

Talking and sound effects are playable through the cassette AUX plug. High scores are automatically saved after each game on disk versions. *Compatible with Trisstick.

Call or write for our complete catalog.

The Quality Continues . . .

MICRO MOONLIGHTER NEWSLETTER

The ONLY publication devoted exclusively to helping you create, build, and maintain a home-based business using your micro-system. SUBSCRIBE NOW to what may be the most important publication in YOUR FUTURE!

1 Year (12 issues) only $25 U.S., $29 Canada, $35 World Wide

J. Norman Goode, Publisher

Micro Moonlighter Newsletter

2115-M Bernard Avenue • Nashville, TN 37212

Visa and Mastercard welcome. Send account number and expiration date.

☐ Visa Acct # _____ Exp. _____

☐ M/C Acct # _____ Exp. _____

Name _____

Address _____

City _____ St. _____ Zip _____

270

Program Listing 1 Continued

```
9,"                ";:GOTO24@
76@ PRINT@65,"YOU ARE A WINNER!";:FORQ=1TO15@@:NEXTQ:PRINT@65,"
                ";:GOTO24@
77@ DATA184,186,287,289,385,318,481,486,411,413,512,514,601,604,
613,615,782,789,883,818,982,987,1083,1088,1186,1113,1205,1214,13
06,1306,1311,1315,1405,1412,1506,1513,95,282,292,469,479,469,656
,668,676,666,843,853,863,873,883
```

Program Listing 2

```
1@@ '      OPENING GRAPHICS AND CREDITS
11@ DEFINTA-X:CLS:PRINTCHR$(23):FORX=@TO126STEP2:SET(X,@):SET(X,
1):SET(X,19):SET(X,2@):SET(X,46):SET(X,47):NEXTX:FORY=3TO17STEP2
:SET(@,Y):SET(1,Y):SET(121,Y):SET(124,Y):NEXTY:FORY=22TO65STEP2:
SET(@,Y):SET(1,Y):SET(121,Y):SET(126,Y):NEXTY
12@ M$="SQUARE MARKER GAME":PRINT@586,"PROGRAM DESIGNED BY";:PRI
NT@714,"CARL A. BEVINGTON";:PRINT@778,"1857 EAST THIRD STREET";:
PRINT@842,"SALEM, oRIO    66468";
13@ FORI=1TO5:PRINT@2@2,"                                    ";:FORQ=1TO5@:NEX
TQ:PRINT@2@2,M$;:FORQ=1TO4@@:NEXTQ,I
14@ '      GRAPHICS FOR DIRECTIONS
15@ CLS:FORY=@TO2@STEP4:FORX=@TO41:SET(X,Y):NEXTX,Y:FORX=@TO4@ST
EP8:FORY=@TO2@:SET(X,Y):SET(X+1,Y):NEXTY,X:FORY=2TO18STEP4:FORX=
4TO36STEP8:SET(X,Y):SET(X+1,Y):NEXTX,Y
16@ '      TEXT OF DIRECTIONS FOR PLAYING GAME
17@ PRINT@36,"DIRECTIONS";:PRINT@152,"THE GAME IS BEGUN BY HAVIN
G MARKERS ON";:PRINT@216,"ALL OF THE CELLS BUT ONE.  THE OBJECT
OF";:PRINT@28@,"THE GAME IS TO REMOVE AS MANY OF THE";
18@ PRINT@344,"MARKERS AS POSSIBLE BY JUMPING OVER ONE";:PRINT@4
86,"ADJACENT MARKER ALONG A STRAIGHT LINE";:PRINT@472,"TO A VACA
NT CELL.  THE JUMPED MARKER IS";:PRINT"REMOVED FROM THE BOARD.  A
LL MARKERS BUT ONE CAN BE REMOVED IN"
19@ PRINT"THIS MANNER WITH THE GOAL BEING TO END THE GAME WITH O
NE MARKER";:PRINT"REMAINING ON THE BOARD.  YOU BEGIN BY TELLING T
HE COMPUTER";:PRINT"WHICH CELL SHOULD BE LEFT VACANT AND THEN ENT
ER MOVES TO JUMP";:PRINT"OVER THE REMAINING MARKERS."
2@@ DIM#(96),F(96),T(96),P(25),L(25):FORI=1TO96:READM(I):F(I)=IN
T(M(I)/188):T(I)=M(I)-188*F(I):NEXTI:FORI=1TO25:READP(I):NEXTI:M
$=CHR$(153)+CHR$(166):B$="  "
21@ PRINT@924,">>PRESS THE SPACE BAR TO CONTINUE<<";
22@ N$=INKEY$:IFN$=" "THEN24@ELSE22@
23@ '      GRAPHICS FOR GAME
24@ CLS:C=1:FORI=66TO112STEP11:PRINT@I,C:PRINT@I+6,M$;:PRINT@128+
I,C+5:PRINT@134+I,M$:PRINT@256+1,C+1@:PRINT@262+I,M$:PRINT@384+I
,C+15:PRINT@39@+1,M$:PRINT@512+1,C+2@:PRINT@518+I,M$:C=C+1:NEXTI

25@ FORY=2TO26STEP6:FOAR=12TO112STEP22:FOAR1=@TO11:SET(X+X1,Y):S
ET(X+X1,Y+6):NEXTX1,X,Y
26@ FORR=12TO112STEP22:FORY=3TO27STEP6:FORY1=@TO2:SET(X,Y+YI):SE
T(X+1,Y+Y1):SET(X+1@,Y+Y1):SET(X+11,Y+Y1):NEXTY1,Y,X
27@ FORI=1TO25:L(I)=I:NEXTI
28@ '      VACANT POSITION SET TO BEGIN GAME
29@ PRINT@916,"WHICH CELL VACANT";:INPUTI:PRINT@916,"
                "
3@@ C=2:L(I)=@:G=I:GOSUB48@
31@ '      INPUT FOR MOVES
32@ PRINT@915,"MOVE FROM";:INPUTMF:PRINT@93@,"TO";:INPUTHT
33@ PRINT@915,"                                        ";
34@ '      CHECK OF POSITIONS FOR MOVES
35@ FORI=1TO96
36@ IFMF=F(I)ANDMT=T(I)THEN48@
37@ NEXTI
38@ PRINT@913,"MOVE NOT POSSIBLE, TRY AGAIN.":FORQ=1TO7@@:NEXTQ
39@ PRINT@913,"                                        ":GOTO32@
4@@ IFL(MT'<>@THEN38@
41@ IFL(MF)=@THEN38@
42@ MO=(T(I)+F(I))/2
43@ IFL(MO)=@THEN38@
44@ L(NO)=@:L(MT)=MT:L(MF)=@:G=MO:H=MT:C=1
45@ GOSUB48@
46@ GOTO56@
47@ '      GRAPHICS FOR MARKERS ON BOARD
48@ FORY=1TO25
49@ IFG=YTHENPRINT@P(Y),B$;
5@@ IFH=YTHENPRINT@P(Y),M$;
51@ NEXTY
52@ IFC=2THEN54@
53@ C=2:G=MF:GOTO48@
54@ RETURN
55@ '      CHECK OF POSSIBLE MOVES REMAINING / END OF GAME / WINN
ING
56@ FORI=1TO96
57@ IFL(F(I))=@THEN61@
58@ LETN=(F(I)+T(I))/2
59@ IFL(M)<>@ANDL(T[I])=@THEN32@
6@@ IFM<>@ANDT(I)=@THEN32@
61@ NEXTI
62@ P=@
63@ FORI=1TO25
64@ IFL(I)=@THEN65@ELSEP=P+I
65@ NEXTI
66@ PRINT@9@5,"NO MORE MOVES POSSIBLE. ";P;"MARKERS REMAIN.";
67@ FORQ=1TO1@@@:NEXTQ
68@ IFP>1THEN71@
69@ PRINT@92@,"YOU ARE A WINNER!!!                    ";
7@@ FORQ=1TO1@@@:NEXTQ
71@ PRINT@915,"                                        ";
72@ PRINT@9@5,"ANOTHER GAME (YES / NO)";:INPUTH$
73@ PRINT@9@5,"                                        ";
74@ IFN$="YES"THEN24@
75@ PRINT@96@,"THANK YOU FOR PLAYING.                   ";:END

76@ DATA183,111,213,286,212,214,381,385,311,313,315,482,414,414,
583,513,515,688,616,616,789,717,719,886,818,816,818,828,987,917,
919,1886,1818,1828,1181
77@ DATA1183,1113,1121,1123,1282,1284,1216,1222,1226,1381,1383,1
385,1311,1315,1321,1323,1325,1482,1484,1412,1422,1424,1583,1585,
1513,1523,1525,1686,1688
78@ DATA1616,1787,1789,1719,1886,1888,1818,1816,1828,1987,1989,1
917,2888,2818,2816,2111,2113,2123,2212,2214,2224,2311,2313,2315,
2321,2325,2412,2414,2422,2513,2515,2523
79@ DATA72,83,94,185,116,288,211,222,233,244,328,339,358,361,372
,456,467,478,489,588,584,595,686,617,628
```


Circle 86 on Reader Service card.

ALIEN DEFENSE

Defend Planet from
6 Different Types
of Alien Attacks

DISK VERSION TALKS

SSM SOFT SECTOR MARKETING, INCORPORATED

6250 Middlebelt •Garden City, Michigan 48135
800-521-6504 / (313) 425-4020

Written by Larry Ashmun. Copyright 1981 Soft Sector Marketing, Inc.

Prices Per Game: TRS-80 16K Level II Mod I/Mod III Cassette $15.95
TRS-80 32K Level II Mod I/Mod III Diskette $19.95

Talking and sound effects are playable through the cassette AUX plug. High scores are automatically saved after each game on disk versions.

Call or write for our complete catalog.

10% discount for 2 items, 15% for 3 or more. Please add $2.50 per order for postage & handling. Michigan residents add 4% sales tax. Outside USA (except Canada) please add $3.50 per order for postage & handling.

MasterCard VISA

A Pot Of Gold For YOUR Color Computer

I buy practically every computer magazine there is but the ***RAINBOW*** *is the only one I read cover-to-cover as soon as it comes in the mail — A subscriber*

The **RAINBOW** gets that sort of response for more reasons than one but the primary one is simply it is the premier magazine for TRS 80 Color Computer users And because it devotes every page of each monthly issue exclusively to the Color Computer it is the single best source of information for everything you want to know

Tired of trying to convert other computer programs to your Color Computer? No worries Each program in the **RAINBOW** is written exclusively for your computer — and many take advantage of all the excellent graphics commands unavailable on other machines! The nation s leading software authors have contributions every month

The **RAINBOW**'s Hints Tips and Pipeline feature give you the best up-to-the-minute information available on the Color Computer If you are looking for ways to do screen prints alphabetize disk directories save machine language programs or print Videotex input on your printer the RAINBOW has programs for you! And if you want to know when some promised software will really be available for purchase you ll get that answered too

Our tutorials have been praised for the clear concise way they explain — in detail — various functions of the Color Computer And the **RAINBOW** s reviews are an excellent and honest buyer s guide to software and other purchases

Whether your Color Computer is 4K 16K or 32K Whether you have Color Basic or Extended Whether you re into assembly language (or want to get into it) or not Printers Disks Rom packs The **RAINBOW** surveys the whole world of the Color Computer each month and provides what one reader called A pot of gold full of fabulous information

Because it is journalistically oriented the **RAINBOW** gives fast turnaround to meet its monthly deadline So you can expect fresh news when it is news and the latest information available

If all this sounds like a lot for $16 per year it may be But we ll make one more promise If after you see your first issue you don t agree that the **RAINBOW** is the premier monthly magazine for Color Computer users we ll happily cheerfully and immediately refund your money

Trademark of Tandy Corp

the RAINBOW

the RAINBOW
1803 Timber Ridge Drive
P O Box 209
Prospect KY 40059

(502) 228 4492

Gentlemen: YES Sign me up right away for a one year U S subscription to the RAINBOW My payment is enclosed

Name _____

Address _____

City _____ State _____ Zip _____

☐ Payment Enclosed

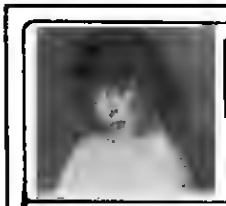
☐ Charge my VISA account #

, Charge my MasterCard Account #

Signature _____ Card Expiration Date _____ Interbank # _____

Subscriptions to the RAINBOW are $16 per year in the United States Canada and Mexico and $50 for other foreign addresses by surface mail and $24 per year to other countries by airmail All subscriptions begin with the current issue Please allow 6 8 weeks for first issue

✓ 296



[513] 294-3383

VISA

"TOO MUCH" FOR RADIO SHACK!

Radio Shack REFUSED to include MISADVENTURE #1 in their SOURCEBOOK due to our description of the game!

THE SOFTCORE SOFTWARE CO.
9 Southmoor Circle, Kettering, OH 45429

#0201 Misadventure #1 [Madam Rosa's Massage Perlor]
#0202 Misadventure #2 [Wet T-Shirt Contest]
***#0203 Misadventure #3 [Sewers of Moscow]**
***#0204 Misadventure #4 [Casino of Pleasure]**
#0301 Dohne' Bugg [Adventure-decoder]
***#0401 Mystery Ot The Keye [COLOR computer only]**

*With Sound

Our MISADVENTURE SERIES consist of CHALLENGING and FUN "adventure-type" programs that may occasionally be a bit naughty!

MYSTERY OF THE KEYS for the color computer is a graphic puzzle as addicting as **"The Cube"** and similar to **"The Link"**. 4k and up.

IN MISADVENTURE #1 the player has to make his way from the sleazy deserted WHARFS, gain admittance to the ancient SPEAKEASY, and attempt to discover the hidden photographs of the politician's beautiful daughter! Brave the deadly alleys, hallways, and traps. Avoid the BOUNCER and the other characters of questionable reputation! Play in the rigged CARD GAME if you dare! Discover why the old man died with a **smile** on his face! Find out why the WINO prefers cheap booze! Above all, try to **escape** without needing any injections of **penicillin!!!**

DOHNE' BUGG is our best-selling ADVENTURE DECODER! Are you STUCK in a machine-language ADVENTURE GAME? This program will display on the screen all VERBS that interact in the game, all LOCATIONS & OBJECTS you will find, and all ACTIONS that result! A MUST FOR THE SERIOUS ADVENTURER! Note: will now work on Model I & III disk systems!

All programs (except #0401) work on 16k MODEL I & III. ✓ 379
$15 EACH — we pay postage!

Immediate shipment! Check, credit cards, or phone order (12-6 p.m.)
Dealers and Distributors welcome—please inquire. Hint Sheets Available!

Program Listing 3

```
10# '     OPENING GRAPHICS AND CREDITS
11# DEFINTA-Z:DIM#(32),P(32),Y(32),P(13),L(32):M$=CHR$(16#)+CHR$
(191)+CHR$(144):B$="   ":N$="LUCKY 13 NUMBER GAME"
12# CLS:PRINTCHR$(23):FORX=#TO126STEP2:SET(X,#):SET(X,1):SET(X,1
9):SET(X,2#):SET(X,46):SET(X,47):NEXTX:FORY=3TO17STEP2:SET(#,Y):
SET(1,Y):SET(121,Y):SET(124,Y):NEXTY:FORY=22TO65STEP2:SET(#,Y):S
ET(1,Y):SET(121,Y):SET(124,Y):NEXTY
13# PRINT#586,"PROGRAM DESIGNED BY";:PRINT#714,"CARL A. BEVINGTO
N";:PRINT#778,"1857 EAST THIRD STREET";:PRINT#842,"SALEM, OHIO
   44460";:FORI=1TO5:PRINT#2#2,"                    ";:FORQ=1T
O5#:NEXTQ:PRINT#2#2,N$;:FORQ=1TO4##:NEXTQ,I
14# '     GRAPHICS AND TEXT FOR DIRECTIONS
15# CLS:FORX=#TO25:SET(X,#):SET(X,4):SET(X,8):SET(X,12):SET(X,16
):SET(X,2#):NEXTX:FORY=#TO4:FORX=#TO24STEP5:SET(X,Y):SET(X+1,Y):
SET(X,Y+5):SET(X+1,Y+8):SET(X,Y+16):SET(X+1,Y+16):NEXTX,Y:FORY=4
TO8:FORX=4TO28STEP8:SET(X,T):SET(X+1,Y):SET(X,Y+8)
16# SET(X+1,Y+8):NEXTX,Y:FORY=2TO18STEP5:FORX=4TO28STEP5:SET(X,Y
):SET(X+1,Y):NEXTX,Y:SET(8,6):SET(9,8):SET(16,8):SET(17,6):SET(8
,14):SET(9,14):SET(16,14):SET(17,14):PRINT#36,"DIRECTIONS";:PRIN
T#146,"THE GAME IS BEGUN BY HAVING MARKERS ON ALL OF";
17# PRINT#218,"THE CELLS BUT ONE.  THE OBJECT OF THE GAME IS";:P
RINT#274,"TO REMOVE AS MANY OF THE MARKERS AS POSSIBLE";:PRINT#3
36,"BY JUMPING OVEX ONE ADJACENT MARKER ALONG A";:PRINT#482,"STR
AIGHT LINE TO A VACANT CELL.  THE JUMPED";
18# PRINT#466,"MARKER IS REMOVED FROM THE BOARD.";:PRINT"ALL MARK
ERX BUT ONE CAN BE REMOVED IN THIS MANNER WITH THE GOAL";:PRINT"B
EING TO END THE GAME WITH ONE MARKER REMAINING ON THE BOARD."
19# PRINT"YOU WILL BEGIN BY TELLING THE COMPUTER WHICH CELL SHOU
LD BE";PRINT"LEFT VACANT AND THEN ENTERING MOVES TO JUMP OVER TH
E REMAINING";PRINT"MARKERS.  ";
2##FORI=1TO32:RXADM(I):F(I)=INT(M(I)/18#):T(I)=M(I)-18#*F(I):NE
XTI:FORI=1TO13:RXADP(I):NEXTI
21# PRINT"DO NOT PRESS THE ENTER KEY TO INPUT MOVES,":PRINT#925,
">>PRESS SPACE BAR TO CONTINUE<<";
22# F$=INKEY$:IFP$=" "THEN24#ELSE22#
23# '     GRAPHICS FOR GAME
24# CLS:FORX=2TO6STEP4:FORY=ATOA+36STEP18:FORX=24TO96STEP36:SET(
X,Y):SET(X+1,Y):SET(X+2,Y):SET(X+3,Y):SET(X+4,Y):SET(X+5,Y):SET(
X+6,Y):SET(X+7,Y):SET(X+6,Y):SET(X+9,Y):NEXTX,Y,A
25# FORA=11TO15STEP4:FORY=ATOA+18STEP18:FORX=42TO78STEP36:SET(X,
Y):SET(X+1,Y):SET(X+2,Y):SET(X+3,Y):SET(X+4,Y):SET(X+5,Y):SET(X+
6,Y):SET(X+7,Y):SET(X+8,Y):SET(X+9,Y):NEXTY,Y,A
26# FORX=24TO32STEP8:FORX=ATOA+72STEP36:FORY=3TO5:SET(X,Y):SET(X
+1,Y):SET(X,Y+18):SET(X+1,Y+18):SET(X,Y+36):SET(X+1,Y+36):NEXTY,
X,A:FORA=42TO5#STEP8:FORX=ATOA+36STEP36:FORY=12TO14:SET(X,Y):SET
(X+1,Y):SET(X,Y+18):SET(X+1,Y+18):NEXTY,X,A
27# FORY=4TO4#STEP18:FORX=36TO56STEP4:SET(X,Y):SET(X+1,Y):SET(X+
36,Y):SET(X+37,Y):NEXTX,Y:FORY=8TO18STEP2:FORX=26TO18#STEP36:SET
(X,Y):SET(X+1,Y):SET(X,Y+18):SET(X+1,Y+18):NEXTX,Y
28# B=7:FORA=34TO52STEP18:FORX=ATOA+36STEP36:FORY=8TO8+18STEP18:
SET(X,Y):SET(X+1,Y):SET(X+2,Y+1):SET(X+3,Y+1):SET(X+4,Y+2):SET(X
+5,Y+2):SET(X+6,Y+3):SET(X+7,Y+3):SET(X+8,Y+4):SET(X+9,Y+4):NEXT
Y,X:B=16:NEXTA
29# B=1#:FORX=34TO52STEP18:FORX=ATOA+36STEP35:FORY=8TO8+18STEP18
:SET(X,47-Y):SET(X+1,47-Y):SET(X+2,46-Y):SET(X+3,46-Y):SET(X+4,4
5-Y):SET(X+5,45-Y):SET(X+6,44-Y):SET(X+7,44-Y):SET(X+8,43-Y):SET
(X+9,42-Y):NEXTY,X:B=19:NEXTA
3##FORI=1TO13:PRINT@P(I)-3,CHR$(I+64);:PRINT@P(I),M$;:NEXTI
31# '     VACANT POSITION SET TO BEGIN GAME
32# FORI=1TO22:L(I)=I:NEXTI:PRINT@128,"WHICH CELL";:PRINT@192,"V
ACANT?";
33# Q$=INKEY$:IFQ$=""THEN33#ELSE34#
34# PRINT@2#1,Q$;
35# Q=ASC(Q$)-64
36# PRINT@128,"              ";:PRINT@192,"              ";
37# C=2:L(Q)=#:H=#:G=Q:GOSUB6##
38# '     INPUT FOR MOVES
39# PRINT@128,"FROM?  ";
4##D$=INKEY$:IFD$=""THEN4##ELSE41#
41# PRINT@135,D$;
42# MF=ASC(D$)-64
43# PRINT@192,"TO?";
44# E$=INKEY$:IFE$=""THEN44#ELSE45#
45# PRINT@197,E$;
46# MT=ASC(E$)-64:PORQ=1TO1##:NEXTQ:PRINT@128,"              ";:PRIN
T@192,"              ";
47# '     CHECK OF POSITIONS FOR MOVES
48# FOR1=1TO32
49# IFMF=F(I)ANDMT=T(I)THEN52#
5##NEXTI
51# PRINT@128,"TRY AGAIN!";:PORQ=1TO3##:NEXTQ:PRINT@128,"
   ";:GOTO39#
52# IFL(MT)<>#THEN51#
53# IFL(MF)=#THEN51#
54# MO=INT((T(I)+F(I))/2)
55# IFL(MO)=#THEN51#
56# L(MO)=#:L(MT)=MT:L(MF)=#:G=MO:H=MT:C=1
57# GOSUB6##
58# GOTO6##
59# '     GRAPHICS FOR MARKERS ON BOARD
6##FORI=1TO13
61# IFG=ITHENPRINT@P(I),B$;
62# IFH=ITHENPRINT@P(I),N$;
63# NEXTX
64# IFC=2THEN66#
65# C=2:G=MF:GOTO6##
66# RETURN
67# '     CHECK FOR POSSIBLE MOVES REMAINING / END OF GAME / WIN
NING
68# FORI=1TO32
69# IFL(F(I))=#THEN73#
7##M=INT((F(I)+T(I))/2)
71# IFL(M)<>#ANDL(T(I))=#THEN39#
72# IFH<>#ANDT(I)=#THEN39#
73# NEXTI
74# P=#:FORI=1TO13
75# IFL(I)=#THEN76#ELSEP=P+1
76# NEXTI
77# IFP=1THEN79#
7##PRINT@126,"NO MOVES";:PRINT@192,ABS(P);"CELLS";:PRINT@256,"
REMAIN";:PORQ=1TO15##:NEXTQ:PRINT@128,"          ";:PRINT@192,"
          ";:PRINT@256,"          ";:GOTO3##
79# PRINT@128,"YOU WIN!";:PORQ=1TO15##:NEXTQ:PRINT@128,"
  ";:GOTO3##
8## DATA1#3,187,111,286,2#8,211,381,3#7,313,41#,589,6#2,688,612,
781,783,711,713,8#2,886,812,985,1##4,1181,1187,1113,1282,1286,12
#8,1383,1387,1311,77,95,113,276,296,461,479,497,662,688,845,663,
881
```

sky sweep

Mission: Destroy Enemy Base

Obstacles: Mountains, Missiles, Meteors, and Much More

Speed: Variable; Beginner to Expert

SSM SOFT SECTOR MARKETING, INCORPORATED

6250 Middlebelt • Garden City, MI 48135 • 800-521-6504/(313)425-4020

Programming by Barlow, Copyright 1982 Soft Sector Marketing, Inc.

Prices per Game: TRS-80 16K Level II Mod I/Mod III Cassette $15.95
TRS-80 32K Level III Mod I/Mod III Diskette $19.95

10% discount for 2 items, 15% for 3 or more. Please add $2.50 per order for postage & handling. Michigan residents add 4% sales tax. Outside U.S.A. please add $4.00 per order for postage & handling.

Talking and sound effects are playable through the cassette AUX plug. High scores of automatic play saved after each game on disk versions.

Call or write for our complete catalog.

MasterCard VISA

The Quality Continues . . .

OUR HARDWARE WORKS HARDER.

Another first for Data Resources. Our latest microcomputer works harder than any comparable product including the TRS80.

Our new LNW80 computer from LNW Research brings your computer's performance right up to the level of the world's most sophisticated microcomputers. Its 4 MHz, Z80A CPU characteristics more than double your original processing speed. It is complete with double density controller, color and b/w, high resolution graphics features, standard R5232 Port and 48K Ram. Of course, the LNW80 is fully compatible with all TRS80 Model I software. So you have the widest available software base to go with your new performance capabilities.

Compare these features:

	LNW80	TRS-80 MODEL III
Processor	4.0 MHz	2.0 MHz
Level II Basic Interp.	Yes	Level III Basic
TRS80 Model I Level II Compatible	Yes	No
48K Bytes Ram	Yes	Yes
Cossette Baud Rate	500/1000	500/1500
Floppy Disk Controller	Single/ Double	Single/ Double
Serial RS232 Port	Yes	Yes
Printer Port	Yes	Yes
Real Time Clock	Yes	Yes
24 x 80 Characters	Yes	No
Video Monitor	Yes	Yes
Upper and Lower Case	Yes	Yes
Reverse Video	Yes	No
Keyboard	63 Key	53 Key
Numeric Key Pad	Yes	Yes
B/W Graphics, 128 x 48	Yes	Yes
Hi-Resolution B/W Graphics 480 x 192	Yes	No
Hi-Resolution Color Graphics (NTSC), 128 x 192 in 8 colors	Yes	No
Hi-Resolution Color Graphics (RGB), 384 x 192 in 8 colors	Optional	No
Warranty	6 Months	90 Days

Now compare our special price—just $1495.00.

With each of the first fifty orders received, we'll also include a free monitor. All orders are shipped free. While you're here, take advantage of another price special:

Verbatim 525.01 5½" diskettes $25.95 per box of 10

We're giving away a free library case* with each of our first 200 orders *(minimum order 2 boxes).

Come in and see the hardworking new LNW80 today, and find out how much harder we work at Data Resources to meet your computer needs. In the long run, it's easier on you.

Call toll-free to order: 800/525-8394 or 800/525-8419. Visa, MasterCard, checks and money orders accepted.

Data Resources
304 Elati Street
Denver, Colorado 80223
(303) 698-1263

✓10

Program Listing 4

```
100 '      POSSIBLE MOVE CODING
110 DEFINTA-Z:DIMC(14),N(38),A(38),B(38):A$=CHR$(166)+CHR$(153):
FORI=1TO38:READN(I):A(I)=INT(N(I)/100):B(I)=N(I)-100*A(I):NEXTI
120 DATA111,103,210,212,204,301,311,313,402,412,507,508,705,709,
806,907,1002,1012,1101,1103,1113,1210,1202,1204,1311,1303,110,20
5,309,413,502,511,903,912,1001,1105,1209,1304
130 '      OPENING GRAPHICS AND CREDITS
140 CLS:PRINTCER$(23):FORI=0TO126STEP2:SET(X,0):SET(X,1):SET(X,1
9):SET(X,20):SET(X,46):SET(X,47):NEXTX:FORY=3TO17STEP2:SET(0,Y):
SET(1,Y):SET(121,Y):SET(124,Y):NEXTY:FORY=22TO45STEP2:SET(0,Y):S
ET(1,Y):SET(121,Y):SET(124,Y):NEXTY
150 N$="'ROUND THE END MARKER GAME":PRINT@586,"PROGRAM DESIGNED
BY";:PRIST@714,"CARL A. BEVINGTON";:PRINT@778,"1657 EAST THIRD S
TREST";:PRINT@842,"SALEM, OHIO     44460";
180 FORI=1TO5:PRINT@198,"                                    ";:FORQ=1TO5
0:NEXTQ:PRINT@198,N$;:FORQ=1TO488:NEXTQ:NEXTI
170 '      GRAPHICS FOR DIRECTIONS
180 CLS:FORX=4TO37:SET(X,0):SET(X,12):NEXTX:FORX=0TO41:SET(X,4):
EET(X,6):NEXTX:FORX=4TO36STEP8:FORY=0TO4:SET(X,Y):SET(X+1,Y):SET
(X,Y+8):EET(X+1,Y+8):NEXTY,X:FORX=0TO4STEP8:FORY=4TO8:SET(X,Y):
SET(X+1,Y):NEXTY,X
190 '      TEXT FOR DIRECTIONS FOR PLAYING GAME
200 PRINT@37,"DIRECTIONS";:PRINT@152,"THE GAME IS BEGUN BY HAVIN
G MARKERS ON";:PRINT@216,"ALL OF THE CELLS BUT ONE.  THE OBJECT
OF";:PRINT@280,"THE GAME IS TO REMOVE AS MANY OF THE";:PRINT@344
,"MARKERS AS POSSIBLE BY JUMPING OVER ONE"
210 PRINT"ADJACENT MARKER ALONG A STRAIGHT LINE TO A VACANT CELL
.  THE";:PRINT"JUMPED MARKER IS REMOVED FROM THE BOARD.  ALL MARK
ERS BUT ONE";:PRINT"CAN BE REMOVED IN THIS MANNER WITH THE GOAL S
ETING TO END THS"
220 PRINT"GAME WITH ONE MARKER REMAINING OR THE BOARD. YOU WILL
BEGIN BY";:PRINT"TELLING THE COMPUTER WHICH MARKER SHOULD LEFT VA
CANT AND THEN";:PRINT"ENTERING MOVES TO JUMP OVER THE REMAINING M
ARKERS.  MOVES"
230 PRINT"AROUND THE ENDS OF THE CELLS ARE PERMITTED.";:PRINT@925
,">>PRESS THE SPACE BAR TO CONTINUE<<";
240 F$=INKEY$:IFF$=" "THEN240ELSE240
250 '      GRAPHICS FOR GAME
260 CLS:FORX=22TO94STEP24:FORX1=0TO11:SET(X+X1,2):SET(X+X1,6):SE
T(X+X1,16):SET(X+X1,26):SET(X+X1,30):NEXTX1,X
270 FORX=18TO86ETEP24:FORX1=0TO11:SET(X+X1,14):SET(X+X1,18):NEX
TX1,X:FORY=3TO5:FORX=22TO94STEP24:FORX1=0TO1STEP1:SET(X+X1,Y):
SET(X+X1+1,Y):NEXTX1,X,Y
280 FORY=15TO17:FORX=18TO86STEP24:FORX1=0TO1STEP1:SET(X+X1,Y)
:SET(X+X1+1,Y):NEXTX1,X,Y:FORY=27TO29:FORX=22TO94STEP24:FORX1=0T
O1STEP1:SET(X+X1,Y):SET(X+X1+1,Y):NEXTX1,X,Y
290 FORX=34TO82STEP24:FORX1=0TO11:SET(X+X1,28):SET(X+X1,4):NEXTX
1,X:Y=7:FORX=32TO39:FORX1=0TO72STEP24:EET(X+X1,Y):NEXTX1:Y=Y+1:N
EXTX
300 Y=19:FORX=17TO23:FORX1=0TO72STEP24:EET(X+X1,Y):NEXTX1:Y=Y+1:
NEXTX:Y=7:FORX=52TO59:FORX1=0TO72STEP24:SET(75-X+X1,Y):NEXTX1:Y=
Y+1:NEXTX:Y=19:FORX=34TO41:FORX1=0TO72STEP24:SST(72-X+X1,Y):NEXT
X1:Y=Y+1:NEXTX
310 FORI=1TO13:C(I)=I:NEXTI:Y=1:FORX=9TO45STEP12:PRINT@X,CHR$(Y+
64);:PRINT@X+68,A$;:Y=Y+1:NEXTX:FORX=259TO397STEP12:PRINT@X,CHR$
(Y+64);:PRINT@X+68,A$;:Y=Y+1:NEXTX:FORX=521TO557STEP12:PRINT@X,C
HR$(Y+64);:PRINT@X+68,A$;:Y=Y+1:NEXTX
320 '      VACANT POSITION SET TO BEGIN GAME
330 P=0:PRINT@846,"                                              ";:PR
INT@915,"                                          ";:PRIST@769,"WHIC
H CELL VACANT?";
340 W$=INKEY$:IFW$=""THEN340ELSE350
350 PRINT@889,N$;:FORQ=1TO200:N=ASC(N$)-64:GOSUB640
360 '      INPUT FOR MOVES
370 PRINT@856,"                                    ";:PRINT@780,"
                    ";:PRINT@856,"FROM?";
380 F$=INKEY$:IFF$=""THEN380ELSE390
390 PRINT@863,F$;:F=ASC(F$)-64:PRINT@866,"TO?";
400 T$=INKEY$:IFT$=""THEN400ELSE410
410 PRINT@871,T$;:T=ASC(T$)-64:FORQ=1TO200:NEXTQ
420 '      CHECKS OF POSITIONS FOR MOVES
430 IFF<14ANDF>0THEN440ELSE370
440 IFT<14ANDT>0THEN450ELSE370
450 IFC(F)=0THEN370
460 IFC(T)<>0THEN370
470 FORI=1TO38
480 IFA(I)<>FTHEN580
490 IFB(I)=TTHEN510
500 NEXTI:GOTO370
510 N=F:GOSUB640
520 N=T:GOSUB660
530 FORI=1TO26
540 IFF*100+T=N(I)THEN590
550 NERTI
560 IF(F*T)/5=INT((F*T)/5)THEN610
570 N=T+F-8:GOSUB640
580 GOTO620
590 N=(T+F)/2:GOSUB640
600 GOTO620
610 N=F+T-6:GOSUB640
620 GOTO740
630 '      GRAPHICS FOR MARKERS ON BOARD
640 C(N)=0:GOSUB680
650 PRINT@G,"   ";:RETURN
660 C(T)=T:GOSUB680
670 PRINT@G+1,A$;:RETURN
680 IFN<5THEN710
690 IFN>9THEN720
700 G=N*12+266:RETURN
710 G=N*12+64:RETURN
720 G=N*12+468:RETURN
730 '      CHECK OF POSSIBLE MOVES REMAINING / END OF GAME / WINN
ING
740 FOER=1TO13
750 IFC(E)=0THEN770
760 P=P+1
770 NEXTX
780 IFP=1THEN910
790 P=0:FORI=1TO3
800 IFC(I)*C(I+1)<>0THEN370
810 NEXTI
820 IFC(4)*C(9)<>0THEN370
830 IFC(13)*C(9)<>0THEN370
840 FORI=5TO8
```

Program Listing 4 Continues

Circle 88 on Reader Service card.

FORTRESS

Only the Fast Survive!

SSM SOFT SECTOR MARKETING INCORPORATED

6250 Middlebelt • Garden City, MI 48135 • 800-521-6504/(313) 425-4020

Written by Larry Ashmun

Copyright © 1982 Soft Sector Marketing, Inc.

Prices per Game: TRS-80 16K Level II Mod I/Mod III Cassette $15.95
TRS-80 32K Level II Mod I/Mod III Diskette $19.95

10% discount for 2 items, 15% for 3 or more. Please add $2.50 per order for postage & handling. Michigan residents add 4% sales tax. Outside USA (except Canada) please add $10.00 per order for postage & handling.

Sound effects are playable through the cassette AUX plug. High scores are automatically saved after each game on disk versions.

Call or write for our complete catalog.

BASIC Compiler,
Model I/III, all DOS

ACCEL2 Plus:

- Bigger optimized subset
- Quicker compilation
- More compact output
- Almost total compatibility

developed in England by Southern Software

CA add 6

ALGORIX
Allen Gelder Software
(415) 387-3131
Box 11721 San Francisco CA 94101

136

Program Listing 4 Continued

```
850 IFC(I)*C(I+I)<>0THEN370
860 NEXTI
870 FORI=10TO12
880 IFC(I)*C(I+1)<>0THEN370
890 NEXTI:GOTO950
900 PRINT@846,"     NO MOVE MOVES POSSIBLE          ";:GOTO920
910 PRINT@846,"ONLY ONE COUNTER REMAINS - YOU WIN!";
920 PRINT@915,"ANOTHER GAME (YES/NO)";:INPUTH$
930 IFN$="YES"THEN310
940 PRINT@915,"                                     ";:PRINT@846,"     T
HANK YOU FOR PLAYING!          ";:END
950 FORI=1TO3
960 IFC(I)*C(I+5)*C(I+10)<>0ANDC(I-1)+C(I+1)+C(I+4)+C(I+6)+C(I+9
)+C(I+11)=0THEN990
970 NEXTI
980 IFC(2)*C(6)*C(10)<>0ANDC(1)+C(3)+C(5)+C(7)+C(11)=0THEN980
990 IFC(3)*C(7)*C(11)<>0ANDC(2)+C(4)+C(6)+C(8)+C(10)+C(12)=0THEN
999
1000 IFC(4)*C(8)*C(12)<>0ANDC(3)+C(7)+C(9)+C(11)+C(13)=0THEN980
1010 FORI=5TO8
1020 IFC(I)*C(I+5)<>0THEN370
1030 IFC(I)*C(I-4)<>0THEN370
1040 IFC(I+1)*C(I+5)<>0THEN370
1050 IFC(I+1)*C(I-4)<>0THEN370
1060 NEXTI:GOTO990
```

Program Listing 5

```
100 '     OPENING GRAPHICS AND CREDITS
110 DEFINTA-Z:CLS:PRINTCHR$(23);:FORX=0TO12STEP2:SET(X,0):SET(X
,1):SET(X,15):SET(X,20):SET(X,46):SET(X,47):NEXTY:FORY=3TO17STEP
2:SET(0,Y):SET(1,Y):SET(121,Y):SET(120,Y):NEXTY:FORY=22TO45STEP2
:SET(0,Y):SET(1,Y):SET(121,Y):SET(120,Y):NEXTY
120 B$="THE STAR MARKER GAME":PRINT@588,"PROGRAM DESIGNED BY";:P
RINT@714,"CARL A. BETINGTON";:PRINT@778,"1857 EAST THIRD STREET"
;:PRINT@842,"SALEM, OHIO    44460";
130 FORI=1TO5:PRINT@282,"                              ";:FORQ=1TO50:NEXT
Q:PRINT@282,N$;:FORQ=1TO400:NEXTQ,I
140 '     TEXT FOR DIRECTIONS
150 CLS:PRINT@25,"DIRECTIONS";:PRINT:PRINT
160 PRINT"THE OBJECT OF THE GAME OF STAR MARKER IS TO REMOVE NIN
E MARKERS":PRINT"FROM THE INTERSECTIONS OF THE STAR LINES.  TO B
EGIN, ANY ONE":PRINT"MARKER MAY BE REMOVED.  AFTER THE FIRST MAR
KER HAS THUS BEEN"
170 PRINT"REMOVED.  PLAYS ARE MADE BY JUMPING OVER AN OCCUPIED C
ELL TO AN":PRINT"UNOCCUPIED CELL AND REMOVING THE JUMPED MARKER
(AS DONE IN":PRINT"CHECKERS .  MOVES MUST BE MADE ALONG ONE OF TH
E STRAIGHT LINES"
180 PRINT"WHICH MARK UP THE STAR.";PRINT:PRINT"THE FORM USED BY
THE COMPUTER TO RECORD MOVES AFTER THE FIRST":PRINT"IS:  FROM? (E
NTER NUMBER OF CELL)  TO? (ENTER NUMBER OF CELL)":PRINT:PRINT@923
,">>PRESS THE SPACE BAR TO CONTINUE<<"
190 P$=INKEY$:IFP$=" "THEN210ELSE190
200 '     GRAPHICS FOR GAME
210 CLS:DIMC(9),Q(10),M(20),S(30):A$=CHR$(153)+CHR$(166)
220 DATA5,6,13,17,24,28,31,39,42,47,50,59,60,68,71,74,82,86,93,9
5,2,3,12,15,20,21,23,25,30,32,34,38,43,46,51,52,57,58,63,64,67,6
9,75,78,78,79,85,87,96,97,95,283,282,292,311,469,489,543,781,817

230 FORI=1TO20:READM(I):NEXTI:FORI=1TO30:READS(I):NEXTI:FORI=0TO
9:READQ(I):NEXTI
240 CLS:FORI=12TO19:SET(I,11):SET(I,15):SET(I+38,11):SET(I+38,15
):SET(I+48,2):SET(I+48,6):SET(I+58,11):SET(I+58,15):SET(I+98,11)
:SET(I+58,15):NEXTI
250 FORI=24TO31:SET(I,35):SET(I,39):SET(I+16,20):SET(I+16,24):SE
T(I+36,23):SET(I+38,27):SET(I+56,20):SET(I+56,24):SET(I+72,35):S
ET(I+72,39):NEXTI
260 FORI=12TO14:SET(12,I):SET(13,I):SET(18,I):SET(19,I):SET(50,I
):SET(51,I):SST(56,I):SET(57,I):SET(70,I):SET(71,I):SET(76,I):SE
T(77,I):SET(108,I):SET(109,I):SET(114,I):SET(115,I):NEXTI
270 FORI=21TO23:SET(40,I):SET(41,I):SET(46,I):SET(47,I):SET(60,I
+3):SET(61,I+3):SET(66,I+3):SET(67,I+3):SET(80,I):SET(81,I):SET(
86,I):SET(87,I):NEXTI
280 FORI=36TO38:SET(24,I):SET(25,I):SET(38,I):SET(31,I):SET(69,I
-33):SET(51,I-33):SET(68,I-33):SET(67,I-33):SST(96,I):SET(97,I):
SET(102,I):SET(103,I):NEXTI
290 A=36:FORI=31TO40:SET(I,A):SET(I+56,59-A):A=A-1:NEXTI:A=19:FO
RX=47TO50:SET(I,A):SET(I+30,35-A):A=A-1:NEXTI:A=10:FORI=57TO6:S
ET(I,A):SET(I+10,17-A):A-A-1:NEXTI:FORI=28TO40STEP2:SET(I,13):SE
T(I+39,13):NREXTI
300 FORI=58TO68STEP2:SET(I,13):NEXTI:A=34:FORI=34TO58STEP4:SET(I
,A):SET(I+34,62-A):A=A-1:NEXTI:A=25:FORI=78TO78STEP4:SET(I,A):SE
T(I-21,48-A):A=A-1:REXTI:A=20:FORI=90TO86STEP4:SET(I,A):SET(I-7
310 FORQ=1TO100:NEXTQ:PRINT@53,A$;:PRINT@263,A$;:PRINT@282,A$;:P
RINT@292,A$;:PRINT@311,A$;:PRINT@469,A$;:PRINT@489,A$;:PRINT@543
,A$;:PRINT@781,A$;:PRINT@817,A$;
320 FORQ=1TO100:NEXTQ:PRINT@27,B;:PRINT@195,1;:PRINT@214,2;:PRIN
T@231,3;:PRINT@250,4;:PRINT@481,5;:PRINT@428,6;:PRINT@475,7;:PRI
NT@713,8;:PRINT@756,9;:FORI=0TO9:C(I)=10:NEXTI:RESTORE
330 '     VACANT POSITION SET TO BEGIN GAME
340 PRINT@915,"                                     ";:
PRINT@915,"WHICH POSITION VACANT";:INPUTN:C-0:PRINT@Q(N),"  ";:C
(N)=0
350 '     INPUT FOR MOVES
360 PRINT@896,"                                     ";:PR
INT@928,"FROM";:INPUTY:PRINT@928,"TO";:INPUTT
370 '     CHECK OF POSITIONS FOR MOVES
380 IFF>9THEN360
390 IFT>9THEN360
400 IFC(T)<>0THEN360
410 IFC(F)=0THEN360
420 G=F*10+T
430 FORI=1TO20
```

Program Listing 5 Continues

FUTUREVIEW INC.

GREAT NEW PROGRAMS FOR YOUR TRS-80!!!

All programs work on both Mod I and Mod III systems

THE PHASE VII™ GAME SYSTEM

In 1978 the first easy-to-play role-playing game appeared on the market. PHASE VII. It was very popular because of its unique feature of using the realms of fantasy AND science fiction. In 1980 it was introduced as a computer game in 16K and 32K versions. The general response was, "It's pretty good, but it could be better." The programmer was crushed and holed himself up in a 3 x 5 closet. He has been working on the program now for two more years. Introducing:

COMPUTER PHASE VII 3.0

The new version is incredible! Imagine yourself aboard a huge space station where both magic and science work! Armed with your special powers you will fight terrible creatures (watch out for the deadly killer toadstools), while searching for the elusive treasures. As you play, you become more powerful and experienced. The game NEVER ends; one sequence of play leads into the next. No two games are the same. You can take on any identity you wish, and have but one single goal: TO SURVIVE. Includes illustrated rule book. $24.95

ORIGINAL PHASE VII™

A computer game that doesn't use a computer! As mentioned above, PHASE VII originally appeared as a human-oriented role playing game. Today it is increasing in popularity, and now has its own magazine, P7. PHASE VII includes rules, maps, a unique percentage generator dice, a sample game game charts ... everything you need to play. There are no supplements to buy! PHASE VII can be played by 2 or more people (no limit!), or singly with the solitaire module.

Original PHASE VII (if purchased with COMPUTER PHASE VII). $7.95
(if purchased seperately) $8.95

FOR MASOCHISTS ONLY (solitaire module allows you to play original PHASE VII by yourself) $3.95

P7 FANZINE

Science fiction/fantasy articles, artwork, trivia quizzes, question and answer articles, and the latest PHASE VII info directly from the author! Of general interest to all SF & F fans as well as PHASE VII players. All subscriptions start with issue 1 (Jan 1982), so you won't miss an issue!

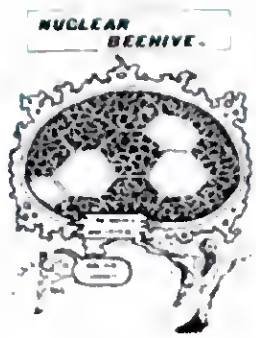
One year (mailed first class) $10.00

The PHASE VII GAME SYSTEM is easy to play, fast, fun, and complete! It will make a fine addition to your collection.

MAROONED AGAIN™

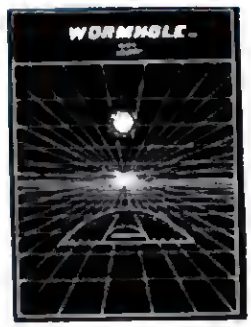
Are you sick of adventure games that go beyond all logic? Relief at last! This one is the best we've ever seen. You have crashed your ship on a hostile planet (fifth time this week). But all is not lost ... you've found an alien ship! The crew is dead, but the ship is in perfect condition. You simply need to find the components to get it to blast off. You send an android to scout the ship, but it was damaged in the crash and it's liable to do almost anything. You must get the ship started and blast to safety. In MAROONED AGAIN all events are logical ... and dangerous! 16K $14.95

See last issue for our NON-DISK Business Software!



NUCLEAR BEEHIVE™

"The reactor's gone critical! Run for cover!!!" The Beehive, the world's most powerful and dangerous super reactor has been sabotaged! The scientist in charge has been killed, leaving you to figure out the cell sequence required to damp down the reactor before it starts core meltdown. If you make a mistake, you will not live to regret it. The Beehive is humming. Time is running out. With sweat pouring down your face, you begin! 16K $14.95

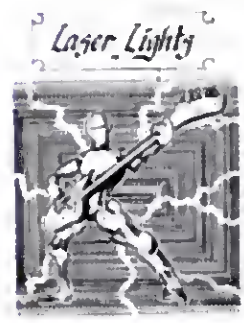


DRAGONLAIR™

Ages ago a great king lived in a series of caves. His daughter fell into a deep sleep (actually, she hacked off a wizard and he put her in suspended animation. Served her right). The king died of grief (not to mention doctor bills), and out of loyalty his servants still remain. Also remaining is a somewhat incredible treasure.

Oh, one little thing. Before he died, the king placed a small dragon to watch over his treasure. That was 500 years ago. Now there is a large dragon.

DRAGONLAIR is not an adventure game. There are over 100 rooms with no dangers. Well, almost none. There is one little surprise... 16K $14.95



WORMHOLE™

Our favorite! A truly great arcade game. You are the navigator aboard the Seeker, a vast deep space cruiser with hyper drive engines. Unfortunately, these engines are malfunctioning. You have just entered a "wormhole," a dangerous warp in the fabric of space. The sides of the wormhole are supercharged, and mean instant destruction if you touch them. Asteroids are also caught in the wormhole, and you must avoid them as well as the hole. To make things really peachy, the wormhole itself is shifting, causing you to warp back and forth between several different universes, all of which contain a different hazard. As a final blow, your fuel is getting low and you need to find a fueling station! A really enjoyable game. 16K $19.95

GIANT SPACE SLUG™

Worms, move over. GIANT SPACE SLUG is here! You are a huge, slimy, icky slug, almost the size of a planet! Your one joy in life is munching space ships that invade your territory. Like all overeaters, however, the more you eat, the larger you grow. The larger you grow, the harder it is to move. Someday you're bound to hit the deadly radiation belt. Fast arcade graphics, high score, multiple levels of play, and SOUND!

plus WARPWAR™

Hyper space is dangerous; too dangerous for men. You are in command of a robot fleet, trying to outwit your opponent. Whoever gets his fleet trapped forfeits his home planet. Your ships will appear out of hyperspace, hoping to gain strategic position. The only problem is that no ship is ever in the same place twice! Three levels of play, one or more players, 16K.

Both for $19.95

LASER LIGHTS™

Put on your favorite record or tape, dim the lights, lean back on your favorite chair, and turn on your computer for one of the most interesting display programs you'll ever see. LASER LIGHTS is a unique, impressive computer light organ. Your favorite music suddenly becomes a pulsating, almost hypnotic computer display. The patterns you see are not random or preset. They are generated completely by your music. Enjoy multiple speed and rhythm sensitivity. You are now within our power. 16K $12.95

TO ORDER: Send check or Money Order.

WE PAY POSTAGE! We will answer non-order inquiries if they include a stamped, self-addressed #10 envelope (SASE). All orders are shipped within 5 days. Order lines open 24 hours a day. Information lines are open 10 a.m. - 3 p.m. (all time zones) Mon. - Fri. Games are available on Mod III disk (add $5.00 to price. Requires 2 disk system.).

DEALERS: Send business card and an SASE for complete dealer information.

PROGRAMMERS: Your software is valuable, and we're the best choice for marketing! Send us an SASE and we'll tell you why. Or better yet, send us a copy of your program for analysis. We market your program FAST! There is no need to wait for a year or more for a marketing decision. FUTUREVIEW will make you money, NOW!

FUTUREVIEW P.O. BOX 101 JOPLIN, MO 64802 (417) 781-8888

RACET COMPUTES = SYSTEM SOFTWARE RACET COMPUTES = SYSTEM SOFTWARE RACET COMPUTES = SYSTEM SOFTWARE RACET COMPUTES = SYSTEM SOFTWARE

Give Your TRS-80* a Tremendous Boost with RACET COMPUTES Software

RACET COMPUTES Utility Software makes the TRS faster, more efficient, and easier to use. Our programming aids improve your productivity. Our reputation is for products that are professional in design and work as advertised!!!

★ NEW SUPERZAP For Radio Shack HARD DISK DRIVE ★ $100

Recover Blown Files!! Now you can directly access, modify, copy, zero, or print any sector on your Radio Shack Hard Disk Drive - under either Version 4.0 or 2.0(a). Also included in this package is a HFIND utility to facilitate a disk search for a specified string. Documentation includes a description of the Version 4.0 directory structure.

★★ Model II Fast Backup Utility ★★ $75

5 TO 10 times faster backups!!! Full disk backup (including verify) in 55 seconds!!! on two drive system — 2:15 on single drive system. In business, time is money, and one BACKUP is worth 1000 tears!!

RACET COMPUTES Utilities & Programmer Aids

Generalized Subroutine Facilities (GSF) Mod I $25, Mod III $30, Mod II $50 The STANDARD against which all other sorts are compared! And then compare price! Multi-key-multi-variable and multi-key character string sorts. Includes zero and move arrays and sample programs.

DISCAT Diskette Cataloging System Mod I and Mod III $50 This comprehensive Diskette Cataloguing/Indexing utility allows the user to keep track of thousands of programs in a categorized library. Machine language program works with TRSDOS and NEWDOS versions (please specify). Files include program names and extensions, program length, diskette numbers.

Infinite BASIC Mod I $50, Mod III $60 Extends Level II BASIC with complete Matrix Functions and 50 more string functions. Includes RACET in-memory sorts!! Select only those functions you want to optimize memory.

Infinite BUSINESS (Requires Infinite BASIC) Mod I and III $30 Complete printer pagination controls, hash codes, binary array search, and packed decimal arithmetic (127-digit accuracy).

COMPROC Command Processor Mod I and Mod III $30 Auto your disk to perform any sequence of instructions that you can give from the keyboard!! Ideal for setting up dedicated applications.

Disk Sort/Merge (DSM) Mod I $75, Mod III $90, Mod II $150 All machine language stand-alone Random file sort package. Establish sort specification in simple BASIC command file. Sorts multiple-diskette files. Only operator action is to switch diskettes when instructed. Super fast sort times - improved disk I/O makes this the fastest Disk Sort/Merge available.

KFS-80 Keyed File System Mod I and III $100, Mod II $175 Machine language BASIC ISAM utility provides keyed and sequential access to multiple files. Simple interface to BASIC. Binary tree index system provides rapid access to records.

Utility Package Mod II $150 Recover blown diskettes. Includes Superzap, bulk copies, and other utilities for repair of blown diskettes. Complete documentation on diskette structure and guidance for repair. Other utilities include Dynamic DEBUG (with single-step, trace, subroutine calling, program looping and more), XCR, DISKIO, Directory Catalog System, XPURGE.

Development Package Mod II $125 Includes RACET Superzap, Apparat Disassembler and Model II interface to Microsoft 'Editor Assembler +' and documentation for Mod I and uploading service. Assemble directly into memory, MACRO facility, save all or portions of source to disk, extended editor commands.

Basic Cross Reference Utility Mod II $50 SEEK and FIND functions for variable, line numbers, strings, keywords. All options available for line number and variables. Load from BASIC - call with control 'R'. Output to screen or printer.

RACET COMPUTES LTD
1330 N. Glenwood, Suite M, Orange, CA 92667 • (714) 997-4950

CHECK, VISA, M/C, C.O.D., PURCHASE ORDER
TELEPHONE ORDERS ACCEPTED (714) 997-4950
*TRS-80 IS A REGISTERED TRADEMARK OF TANDY CORPORATION
CIRCLE READER RESPONSE FOR FREE CATALOG

41

Program Listing 5 Continued

```
440 IFG=N(I)THEN470
450 NEXTI
460 GOTO360
470 N=F:PRINT@O(N),"  ";:C(N)=0
480 IFP*T=?THENP=P+2
490 IFP=5ANDT=0THENP=P-1
500 IPP=8ANDT=5THENP=P-1
510 N=INT((F+T+1)/2):C(N)=0:C(T)=10
520 '     GRAPHICS FOR MARKERS ON BOARD
530 PRINT@O(N),"  ";:C(N)=0
540 PRINT@O(T),AS;
550 '     CHECK FOR POSSIBLE MOVES REMAINING / END OF GAME / WIN
NING
560 IFC(1)+C(2)+C(3)+C(4)=40ANDC(0)+C(5)+C(6)+C(7)=0THEN740
570 IFC(0)+C(2)+C(5)+C(8)=40ANDC(1)+C(3)+C(6)+C(7)=0THEN740
580 IFC(0)+C(3)+C(6)+C(9)=40ANDC(2)+C(4)+C(5)+C(7)=0THEN740
590 IFC(4)+C(6)+C(7)+C(8)=40ANDC(2)+C(3)+C(5)+C(9)=0THEN740
600 IFC(1)+C(5)+C(7)+C(9)=40ANDC(2)+C(3)+C(6)+C(8)=0THEN740
610 PORI=1TO30
620 A=INT(S(I)/10):B=S(I)-10*A
630 IFC(A)<>0THEN650
640 GOTO660
650 IFC(B)<>0THEN360
660 NEXTI
670 PORI=0TO9
680 IFC(I)=0THEN700
690 C=C+1
700 NEXTI
710 IFC>1THEN730
720 PRINT@910,"          YOU NIN !!!!                    ";:F
ORQ=1TO1500:NEXTQ:PRINT@910,"
                    ";:GOTO310
730 PRINT@896,"                    ";C;"PIECES REMAIN.";:FQ
RQ=1TO1500:NEXTQ:PRINT@896,"                              ";
740 PRINT@917,"NO MORE MOVES POSSIBLE.";:FORQ=1TO1500:NEXTQ:PRIN
T@896,"                                   ";:GOTO310
```

Program Listing 6

```
100 '     OPENING GRAPHICS AND CREDITS
110 DEFINTA-Z:DIMM(42),P(42),T(42),J(42),P(19),L(29):M1S=CHR$(18
8)+CHR$(140)+CHR$(140)+CHR$(140)+CNR$(140)+CHR$(188):M2S=CHR$(19
1)+CHR$(128)+CHR$(128)+CHR$(128)+CHR$(128)+CHR$(191):M3$+CHR$(14
3)+CHR$(140)+CHR$(140)+CHR$(140)+CHR$(140)+CHR$(143)
120 N$=CHR$(150)+CHR$(173):N$="DOUBLE TRIANGLE MARKER GAME":B$="
"
130 CLS:PRINTCHR$(23):FORX=0TO126STEP2:SET(X,0):SET(X,1):SET(X,1
9):SET(X,20):SET(X,46):SET(X,47):NEXTX:FORY=3TO17STEP2:SET(0,Y):
SET(1,Y):SET(121,Y):SET(124,Y):NEXTY:FORY=22TO45STEP2:SET(0,Y):S
ET(1,Y):SET(121,Y):SET(124,Y):NEXTY
140 PRINT@586,"PROGRAM DESIGNED BY";:PRINT@714,"CARL A. BEVINGTO
N";:PRINT@778,"1857 EAST THIRD STREEX";:PRINT@842,"SALEM, OHIO
   44460";:FORI=1TO5:PRINT@196,"                              ";:FO
RQ=1TO50:NEXTQ:PRINT@196,N$;:FORQ=1TO400:NEXTQ,I
150 '     GRAPHICS AND TEXT FOR DIRECTIONS
160 CLS:FORX=0TO16:SET(X,0):SET(X+17,0):SET(X,4):SET(X+17,4):SET
(X+4,8):SET(X+13,8):SET(X+4,28):SET(X+13,28):SET(X+8,12):SET(X+8
,16):SET(X,24):SET(X+17,24):SET(X,26):SET(X+17,26):NEXTX
170 PORR=8TO32STEP8:FORY=1TO3:SET(R,Y):SET(R+1,Y):SET(R,Y+24):SE
T(R+1,Y+24):NEXTY,R:FORR=4TO28STEP8:FORY=4TO8:SET(R,Y):SET(R+1,Y
):SET(R,Y+16):SET(R+1,Y+16):NEXTY,R:FORR=8TO24STEP8:FORY=8TO12:S
ET(R,Y):SET(R+1,Y):SET(R,Y+8):SET(R+1,Y+8):NEXTY
180 NEXTR:FORY=13TO15:SET(12,Y):SET(13,Y):SET(28,Y):SET(21,Y):NE
XTY:FORX=4TO28STEP8:SET(X,2):SET(X+1,2):SET(X,26):SET(X+1,26):NE
XTX:FORX=8TO24STEP8:SET(X,6):SET(X+1,6):SET(X,22):SET(X+1,22):NE
XTX
190 PORX=12TO28STEP8:SET(X,10):SET(X+1,10):SET(X,18):SET(X+1,18)
:NEXTX:SET(16,14):SET(17,14)
200 PRINT@836,"DIRECTIONS";:PRINT@146,"THE GAME IS BEGUN BY HAVIN
G MARKERX ON ALL OP";:PRINT@210,"THE CELLS BUT ONE.  THE OBJECT
OF THE GAME IS";:PRINT@274,"TO REMOVE AS MANY OF THE MARKERS AS
POSSIBLE";
210 PRINT@338,"BY JUMPING OVER ONE ADJACENT MARKER ALONG A";:PRI
NT@402,"STRAIGHT LINE TO A VACANT CELL.  tHE JUNPED";:PRINT@466,
"MARKER IS REMOVED FROM THE BOARD.  ALL MARKERS";:PRINT@530,"BUT
 ONE CAN BE REMOVED IN THIS MANNER WITH THE";
220 PRINT@594,"GOAL BEING TO END THE GAME WITH ONE MARKER";:PRIN
T@658,"REMAINING ON THE BOARD."
230 PRINT"YOU WILL BEGIN BY TELLING THE COMPUTER WHICH CELL SHOU
LD BE";PRINT"LEPT VACANT AND THEN ENTERING MOVES TO JUMP OVER TH
E REMAINING";PRINT"MARKERS.  ";
240 PORI=1TO42:READN(I):F(I)=INT(M(I)/100):T(I)=M(I)-100*F(I)
250 IFF(I)>=10ANDINT((F(I)+T(I))/2)=(F(I)+T(I))/2THENJ(I)=INT((F
(I)+T(I))/2)
260 IFF(I)<10THENJ(I)=INT((F(I)+T(I)+1)/2)
270 IFF(I)>=10ANDINT((F(I)+T(I))/2)<>(F(I)+T(I))/2THENJ(I)=INT((
F(I)+T(I)-1)/2)
280 IPF(I)=10ANDT(I)<10THENJ(I)=INT((F(I)+T(I)+1)/2)
290 NEXTI:FORI=1TO19:READP(I):NEXTI
300 PRINT"DO NOT PRESS THE ENTER KEY TO INPUT MOVES.";PRINT@925,
">>PRESS SPACE BAR TO CONTINUE<<";
310 F$=INKEY$:IFF$=" "THEN330ELSE310
320 '     GRAPHICS FOR GAME
330 CLS:FORI=1TO19:PRINT@P(I),M1S;:PRINT@P(I)+64,M2S;:PRINT@P(I)
+128,M3S;:NEXTI:FORX=16TO21:X1=INT((X-4)/2):SET(X,X1):SET(X,44-X
1):SET(X+90,14-X1):SET(X+98,30+X1):NEXTX:FORX=34TO39:X1=INT((X-1
8)/2):SET(X,X1):SET(X,44-X1):SET(X+54,26-X1)
340 SET(X+54,18+X1):NEXTX:PORX=52TO57:X1=INT((X-48)/2):SET(X,X1)
:SET(X,28-X1):SET(X,X1+12):SET(X,32-X1):SET(X,X1+24):SET(X,44-X1
):SET(X+18,14-X1):SET(X+18,X1+6):SET(X+18,26-X1):SET(X+18,X1+18)
:SET(X+18,38-X1):SET(X+18,X1+30):NEXTX
350 FORX=16TO39:SET(X,4):SET(X+36,4):SET(X+72,4):SET(X,48):SET(X
+36,48):SET(X+72,48):SET(X+18,18):SET(X+54,18):SET(X+18,34):SET(
X+54,34):NEXTX:FORY=14TO18:SET(63,Y):SET(64,Y):SET(63,Y+12):SET(
64,Y+12):NEXTY
360 FORI=1TO19:PRINT@P(I)+128,CHR$(I+64);:PRINT@P(I)+66,N$;:NEXTI
370 '     VACANT POSITION SET TO BEGIN GAME
380 FORI=1TO19:L(I)=I:NEXTI:PRINT@448,"WHICH CELL VACANT?";
390 Q$=INKEY$:IFQ$=""THEN390ELSE400
400 PRINT@467,Q$;:FORQ=1TO50:NEXTQ
410 Q=ASC(Q$)-64
420 PRINT@448,"                ";
430 C=2:L(0)=0:N=8:G=0:GOSUB580
```

Program Listing 6 Continues

Program Listing 6 Continued

```
440 '      INPUT FOR MOVES
450 PRINT@440,"FROM?   ";
460 D$=INKEY$:IFD$=""THEN460ELSE470
470 PRINT@455,D$;
480 MF=ASC(D$)-64
490 PRINT@468,"TO?";
500 E$=INKEY$:IFE$=""THEN500ELSE510
510 PRINT@465,E$;
520 MT=ASC(E$)-64:FORQ=1TO100:NEXTQ:PRINT@440,"
  ";
530 '      CHECK OF POSITIONS FOR MOVES
540 FORI=1TO42
550 IFMF=F(I)ANDMT=T(I)THEN580
560 NEXTI
570 PRINT@440,"TRY AGAIN!";:FORQ=1TO300:NEXTQ:PRINT@440,"
              ";:GOTO450
580 IFL(MT)<>0THEN570
590 IFL(MF)=0THEN570
600 IFL(J(I))=0THEN570
610 L(J(I))=0:L(MT)=MT:L(MF)=0:G=J(I):H=MT:C=1
650 GOSUB660
660 GOTO760
670 '      GRAPHICS FOR MARKERS ON BOARD
680 FORZ=1TO19
690 IFG=ZTHENPRINT@F(Z)+66,B$;
700 IFH=ZTHENPRINT@F(Z)+66,M$;
710 NEXTZ
720 IFC=2THEN740
730 C=2:G=MF:GOTO680
740 RETURN
750 '      CHECK FOR POSSIBLE MOVES REMAINING / END OF GAME / WIN
NING
760 FORI=1TO42
770 IFL(F(I))=0ORL(T(I))<>0THEN790
780 IFL(F(I))<>0ANDL(T(I))=0ANDL(J(I))<>0THEN850
790 NEXTI
800 P=0:FORI=1TO19
810 IFL(I)=0THEN820ELSEP=P+1
830 NEXTI
840 IFP=1THEN850
860 PRINT@320,"NO MOVES";:PRINT@384,ABS(P);"CELLS";:PRINT@448,"
REMAIN";:FORQ=1TO1500:NEXTQ:PRINT@320,"          ";:PRINT@384,"
      ";:PRINT@448,"          ";:GOTO360
850 PRINT@448,"YOU WIN!";:FORQ=1TO1500:NEXTQ:PRINT@448,"
  ";:GOTO360
880 DATA103,108,206,289,301,398,402,489,507,510,614,705,710,801,
803,812,902,904,911,1005,1007,1013,1015,1109,1116,1118,1208,1217
,1218,1220,1315,1408,1510,1513,1611,1616,1712,1719,1811,1816,191
2,1917
870 DATA2,28,30,56,139,157,175,276,294,413,532,550,651,669,687,7
76,780,806,824
```


for the TRS-80 from Micro-Mega

The Original GREEN-SCREEN

The eye-pleasing Green-Screen fits over the front of your TRS-80 Video Display and gives you improved contrast with reduced glare. You get bright luminous green characters and graphics like those featured by more expensive CRT units.

Don't confuse the Original Green-Screen with a piece of thin film stuck to the face of your video tube, such as that advertised by others. The Original Green-Screen is mounted in a full frame perfectly matched to the color and texture of the TRS-80 Video Display. It is attached with adhesive strips which do not mar your unit in any way.

The full frame design of the Original Green-Screen "squares off" the face of your video display and greatly improves the overall appearance of your system.

(Specify whether for Model I or Model III)

THE GREEN-SCREEN.....*$13.95*

Add $1.50 for postage and handling.

Terms: Check or money order, no CODs or credit cards, please. Add amount shown for postage and handling to price of the item. All items shipped within 48 hours by first class or priority mail. Virginia residents add 4% sales tax. ↙182

Micro-Mega · P.O. Box 6265 · Arlington, Va 22206

From the originators of the Great Arcade experiences Missile Attack & Scarfman . . .

Great Bouncing Boulders It's . . .

BOUNCEOIDS

FOR TRS-80 MODELS I & III

The NEWEST ARCADE EXPERIENCE!

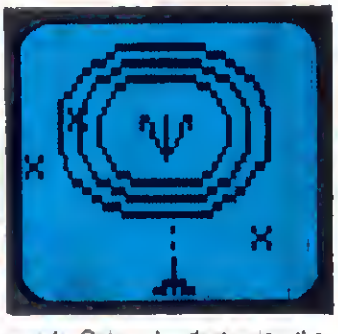
Where do they come from? What do they mean? You'll leave those questions to the scientists. Your duty is clear:

DESTROY!

Utilizing your newly issued class 4 annihilator, you must reduce the massive BOUNCEOID BOULDERS to cosmic dust! BEWARE! They bounce off of walls like giant pool balls, and the smallest touch means instant death! And as an added complication, terrible shaking bugs come slithering out of null space to crunch you into bug lunch! If you can prove yourself worthy, you will be challenged by the mysterious alien invaders in a nerve grinding test of incredible coordination and targetting skills. Can you live? Will you survive?

New! SPACE CASTLE

FOR TRS-80 MODELS I & III



Will you save the Andromeda Galaxy by destroying the Space Castle or will the evil warlord Yugdab continue to rule, uncontested? Locked in battle with Yugdab, your main defense is your ability to skillfully handle your ship and it's projectiles. If you are not careful, Yugdab's intelligent mines will hunt you down and blow you into space dust.

Written in machine language, BOUNCEOIDS and SPACE CASTLE have the EXCITEMENT, GRAPHICS, SOUND and REAL TIME ACTION that are a tredemark of the CORNSOFT GROUP. BOUNCEOIDS and SPACE CASTLE work with Alpha Joystick and Trisstick.

Model I & III Tape: 15.95 + 1.50 Shipping each
Model I & III Disk: 19.95 + 1.50 Shipping each

Indiana Residents Add 4% Sales Tax

The Cornsoft Group

6006 N. KEYSTONE AVE.
INDIANAPOLIS, IN 46220
(317) 257-3227 ↙308

MASTER CARD & VISA ORDERS ACCEPTED

Available through Better Software Dealers everywhere

TRS 80® is a registered trade mark of the Tandy Corp

↙See List of Advertisers on page 338

The Key Box

Basic Level II
Model I or III
16K RAM

Taking a different tack with trek.

Save Our Ship

Randy Hawkins
6214 Hidden Cova
Corpus Christi, TX 78412

Star Trek Adventura combinas tha excitament of an outer spaca shoot-out with the mystarious riddles of advantura game programming. If you have a TRS-80 with at least 16K of mamory, than this varsion of Star Trak is for you.

You are cast as the captain of the Starship Enterprise. You awake in your quarters to find you are alone on board an eerie and quiet Enterprise.

Making your way to the bridge, you discover the danger: Klingons have takan over the ship, captured the entira craw and disabled the anginas. The Enterprise will soon begin to burn in the atmosphara of the planet below. You must do somathing, quickly! But what can one man do against such odds?

Program Listing 1

```
0 GOSUB5500:'* * * * * * * *
   *   BY RANDY HAWKINS    *
   *  CORPUS CHRISTI, TEX  *

  *    0/01 REVISION      *
   * * * * * * * * * * * * *
5 CLS:PRINT@334,CHR$(23)"S T A R   T R E K":PRINT@390,"A O V E N
 T U R E":CLEAR500:DEFINTA-Z
10 DIMDS$(32),DI(32,5),OB$(26),OB(26),DI$(5),VB$(21),NN$(26),DO$
(5)
20 ML$="THIS SAVES ROOM FOR PRINT SCRAMBLER!"
29 J=PEEK(VARPTR(ML$)+1)+256*PEEK(VARPTR(ML$)+2):J=J+65535*(J>32
767):FORK=JTOJ+35:READX:POKEK,X:NEXTK:DELETE29:DATA221,110,3,221
,102,4,210,154,4,221,126,5,183,40,1,119,121,254,120,210,166,4,25
4,32,210,6,5,254,64,210,125,4,61,195,125,4
30 S1=PEEK(16414):S2=PEEK(16415):POKE16414,PEEK(VARPTR(ML$)+1):P
OKE16415,PEEK(VARPTR(ML$)+2):FX=PEEK(16414)+256*PEEK(16415)+32:I
FPEEK(16396)=201THENPOKE16396,23ELSEPOKE23006,0
35 ONERRORGOTO1620
40 FORI=1TO32:PRINT@62+I*2,CHR$(100);:PRINT@630+I*2,CHR$(143);:F
ORJ=0TO5:READDI(I,J):NEXTJ,I:FORI=1TO26:READOB(I):NEXTI
50 DATA2,0,0,0,0,0,0,3,1,10,0,0,0,0,0,2,0,0,4,4,4,4,0,0,0,11,12,
9,0,0,0,0,10,0,9,17,7,10,0,0,0,0,0,7,0,0,0,0,0,5,0,0,0,6,6,2,0,7
,0,0,0,0,13,5,0,0,5,13,0,0,0,0,11,0,0,12,0,0
60 DATA14,16,10,0,0,0,17,10,0,15,0,0,0,16,0,14,0,0,0,0,15,0,6,24
,14,19,18,15,0,0,0,0,0,10,0,0,24,27,0,23,0,0,0,22,0,0,0,0,22,22,
23,21,0,0,22,20,23,23,0,0,0,0,20,0,17,29
```

Program continues

Two-word Sentences

Like most other adventure games, the screen displays a description of the surrounding area with a list of items around you and indicates the obvious exits from your present location.

After the word Command? a blinking cursor reminds you that the program is waiting for your next instruction. Enter your instructions in simple two word sentences—a verb and a noun. The program recognizes over 40 words.

To move from one room to another, try sentences like "go north," "go up" or simply enter the direction, such as west or down. If you are at a "dead end" and cannot figure out what to do try "help."

To see what you are carrying, type in INVENTORY.

Type in SCORE to see how you are progressing; you receive points for certain important events or items in your possession. You complete your adventure and receive a promotion to commodore with a score of 100 percent.

To stop your game before it is completed, type QUIT. You can see the area around you by typing LOOK AROUND. This is useful, if the description has scrolled off the screen. There are of course many other words that the program will recognize such as get, drop, press and say. Figuring out what words do is all part of the game.

Star Trek Adventure (Program Listing 1) has several unique features. First, and most important, is the print scrambler. Lines 20 through 30 set up a special machine-code routine that intercepts all

We're not soft on software

Data resources continues it commitment to professional quality TRS-80* software with the Silver Edition Software Series. . . selected programs from talented and popular authors.

New from Data Resources

On-Line ordering System

Data Resources Corporation now sponsors an electronic message system with on-line electronic ordering. Forum - 80 #2™ of Denver, Colorado is available 24 hours daily at 303/399-8858 providing access to latest Information concerning specials, prices, and products for the TRS-80 disk user.

Enter the (L)OCAL features list to place orders, ask questions, give feedback about products and services. in addition, you will find some great entertainment, downloading and information files.

ANSWER $249.00
By NABS

Answer. a new type of information organizer. Utilizing the directory principle, Answer solves information problems by creating simple forms enabling you to put information where it should be or in many different places at the same time.

Answer . lets you organize almost any type of information in many different sequences and lets each information group grow to almost any size. it is safe to connect the information on hundreds of diskettes You can solve many problems yourself . without programming skills

- Split screen design
- Multiple records on screen
- On-screen form creation
- Multi-level menu driven
- Compound data base
- Variable length random access
- 25 Key fields plus .
- Supports 1-4 diskette drives
- Interactive editing
- Record lock-out
- All keys equal

INTERACTIVE BUSINESS SYSTEM INVENTORY CONTROL
By Tom Williams

The interactive system for inventory control offers the small manufacturing business savings in the thousands of dollars in reduced staff and accounting costs. Here's how it works.

When an invoice is typed:

- the customer's name and both addresses are obtained from the CUSTOMER LIST file
- the company data is obtained from the COMPANY DATA file
- the product data is retrieved from the INVENTORY CONTROL file.
- the INVENTORY CONTROL DATA file is updated by the invoice
- the SALES DATA file is updated by the invoice.
- the invoice is automatically entered in the ACCOUNTS RECEIVABLE file

The results are: the invoice is typed, customer data is gathered, items purchased are listed, multiples extended, invoice totalled, discounts computed, shipping costs added, interest added for late payers and data is entered in inventory control, sales data file and in accounts receivable. .in about 50 seconds without mathematical or posting error
For Model I or III $500.00

B.T. ENTERPRISES
UNITERM/80
By Pete Roberts

This is the state-of-the-art in communications software. It configures itself for either Model I or Model III and can be used with any standard modem, both RS-232 and Bus-Decoding Especially designed to use the extended commands in NEWDOS/80, but fully compatible with all major DOS systems
For Model I and III. $89.00

THE FLOPPY DOCTOR
By Dave Stambaugh

FLOPPY DISK/MEMORY DIAGNOSTIC programs are designed to thoroughly check out the two most trouble prone sections of the TRS-80, the disk system (controller and drives) and the memory arrays
MODEL I $24.95
MODEL III $29.95

SPECIAL
AIDS II Super systems
AIDS II & CALCS III & MERGE III
MODEL I or III $99.95
AIDS III & CALCS IV & MERGE II
MODEL I or II $109.95

MODEL 1
DOUBLE DENSITY PACKAGE
Newdos/80 Version 2.0
with the LNDOUBLER $219.95
with the LNDOUBLER **5/8** $249.95
Dosplus Version 3.4
with LNDOUBLER $169.95
with LNDOUBLER **5/8** $199.95

Everything you need to convert your TRS-80 Model 1, to run double density Complete with software, hardware, and instructions, Installs in minutes with no soldering, wiring or cutting.

LNDOUBLER alone $139.95
LNDOUBLER **5/8** $169.95

The LNDOUBLER is the most reliable double density modification known to Data Resources for the Model 1. The 5/8 version allows mixing and matching 5¼" drives and 8" drives

NEWDOS/80 Version 2.0
for MODEL I and III

The hottest Disk Operating System is now available in its latest version. This is the ONE from Apparat, Inc., the people whose systems have made the TRS-80 the reliable computer $149.00

DOSPLUS
For MODEL 1 **$99.95**

DOSPLUS gives you more of what you buy an operating system for. Speed and reliability without sacrificing simplicity and power. If you need extra power without extra wait, then you need DOSPLUS!

Data Resources
304 Elati
Denver, CO 80223
(303) 698-1263

To order call toll free.

(800) 525-8394

Mastercard and Visa welcome
Checks - COD - Money Orders also accepted
Orders shipped UPS free.
Colorado residents add 6½ per cent sales tax
Attractive discounts to dealers

* 1982 Data Resources Corp.

TRS-80* IS A TRADEMARK OF TANDY CORP.

Prices in effect through August 31, 1982 and subject to changes.

"Just reading the list of nouns, verbs and descriptions gives too much of the mystery away."

print statamants and altera them slightly. As a result, all the print statements and strings in the program that appaar to be gibberish in tha Listing appear unscrambled whan you play tha gama.

I did this for two raasons. First, I have typed several othar Basic Bdventura gamas mysalf, but by the tima I had read through the program and, laboriously, typed avary lina, I knaw how to solva tha adventura's riddles bafora tha first execution. Just reading tha list of nouns, varbs and descriptions givas too much of tha mystery away.

Secondly, if you ahould pass this program on to a friand, he will be unabla to list it to find tha same information.

Tha program will work with either atandard Laval II Basic or TRSDOS 2.3 Basic. You can use other disk oparating systems, if you know how to disabla tha Break kay. Tha key is disabled in lina 30 and reenabled in lina 1650. By taking away the Braak function from tha usar, he is forced to use the quit command to exit the program. Thia is necessary becausa of the print scrambler. If you wara to leave the program while tha scrambler was still activated, all messages such as Ready and your own antrias would be garbled. Whan tha quit commend is processed, tha print scrambler will be turned off and the Braak kay anabled.

If you know how to diaable the Break kay with your disk oparating systam, substitute tha disabla command for the POKE 23886,0 in line 30 and tha enable command for the POKE 23886,1 in lina 1650.

I also racommand that you type the entira program bafora axecuting it; that way both tha print scrambler and Braak key functions are turned on and off automatically.

After completing the program antry, save it to tape or disk before executing. An error in the print scramblar could return you to the memory alza prompt.

Program continued

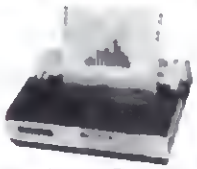
```
7B DATA29,28,25,B,B,0,0,0,0,27,B,0,B,26,27,20,0,0,20,30,20,25,0,
B,0,0,25,0,24,0,30,32,31,20,0,B,30,0,B,0,0,0,0,0,0,0,30,0,B
00 DATA32,12,13,11,5,10,15,20,25,26,7,14,27,4,0,4,16,19,21,21,21
,27,31,32,1,5
1BB DS$(1)="JO UIF DBQUBJO'T RVBSUFST PO CPBSE
UIF GFEFSBUJPO TUBSTIJQ FOUFSQSJTF.":DS$(2)="JO B DPSSJEPS PG UI
F FOUFSQSJTF.
JOUFSTFDUJOB IBNMXBZT NFBE PGG JO BNN EJSFDUJPOT."
105 DS$(3)="JO UIF USBOTQPSUFS SPPN.  PO POF TJEF JT
B DPOOSPN QBOFN ... PO UIF PUIFS UIP USBOTQPSUFS DIBNCFS.":DS$(4
)="PO UIF TVEGBDF PG QMBOFU UPJSBT 00 ...
B SPOLZ EFTPMBUF DFSSBJO VOEFS B TDFSDIJOB TVO."
110 DS$(5)="BU UIF FOUSBODF UP B UVSCPMJGU.":DS$(6)="JO UIF UVSC
PMJGU."
115 DS$(7)=DS$(2):DS$(8)="JO POF PG UIF DSFX'T RVBSUFST.
MJLF BNM UIF PUIFST, JU IBT B CFE, ESFTTJOH SPPN, BOE DMPTFU.":D
S$(9)=DS$(6):DS$(10)=DS$(5)
120 DS$(11)="BU UIF OBWJHBUJPO OPOUSPN DPOUFS...
B UXP NBO QPTU VTVBMMZ NBOOPE CZ TVMV BOE DIFLIPW.":DE$(12)="BO
UIF DPNNVOJDBUJPOT TUBUJPO...
B DFNQMJDBUFE QBOFN PG JOTUSVNFOUT VTVBMMZ NBOOPE CZ VIVSV."
125 DS$(13)="BU UIF TDJFODF PGGJDFS'T TUBUJPO...
UIF QSJNBSZ DPOUSPN QPTU GFS UIF TIJQ'T DPNQVUFS." ...
130 DS$(14)=DS$(2):DB$(15)=DS$(5):DS$(16)="JO UIF TIJQ'T MJCSBSZ
...
B WBTU SFPN FRVJQQFE XJUI WJFXJOH TOSFFOT BOE UBQFT.":DS$(17)=DS
$(6):DS$(18)=DS$(2):DS$(19)="JO UIF TJDL CBZ...
BSPVOE ZPV BSF WBSJPVT JUFNT PG HFEJDBN FRVJQHFOU.":DS$(20)=DS$(
5)
140 DS$(21)="JO UIF TIJQ'T DFOUSBN TVQQMZ XBSFIPVTF.":DS$(22)=DS
$(2):DS$(23)=DS$(2):DS$(24)=DS$(6):DS$(25)=DS$(5):DS$(26)="JO B
TFDVSJUZ DFMM JO UIF CSJR.":DS$(27)=DS$(2)
150 DS$(28)=DS$(2):DS$(29)=DS$(6):DS$(30)="JO UIF FOHJOFFSJOH TF
DUJPO —
B MBSBF SPFN XJUI UXP TNBMN BERPJOJOH SPFNT. BU UIF GBS FOE PG
UIJT BSFB JT DIF NBUUFS / BOUJ-NBUUFS XBSQ FOHJOF ESJWF."
155 DS$(31)="BU UIF EJMJUIJVN DSZTUBN QPXFS TUBUJPO.":DS$(32)="B
U UIF BVYJMJBSZ DPOUSPN TUBUJPO."
160 OB$(1)="BO VOBSNFE LMJOBPO DPNNBOEFS":OB$(2)="B CVUUPO NBCFN
NFE TFOTPST":OB$(3)="B CVUUPO NBCPMMPE TIJQ'T TUBUVT":OB$(4)="B
CVUUPO NBCPMMPE GJSF JNQVMTF FOHJOFT"
170 OB$(5)="B TJHO PO UIF PQQPTJUF XBNM":FORI=6TO9:OB$(I)=OB$(5)
:NEXTI:OB$(10)="NS. TQPOL NZJOB VODPOTDJPVT PO UIF GNPPS":OB$(11
)="B LMJOBPO TPNEJFS":OB$(12)="B LMJOBPO HVBSE"
180 OB$(13)="B LMJOBPO TFOUSZ":OB$(14)="B LMJOBPO PGGJDFS":OB$(1
5)="B GVSSZ DEFBUVSF LOPXO BT B USJCCMF":OB$(16)="SBX EJMJUIJVN
OSZTUBNT":OB$(17)="UIF UFDOJDBN NBOVBM GPS UIF TUBSTIJQ FOUFSOSJ
TF"
190 OB$(18)="B IZQF XJUI UIF NBCFN BOUJEPUF JOKFDUJPO":OB$(19)="
B QIBTFS":OB$(20)="B DPNNVOJDBUPS":OB$(21)="BO FNFDUSPOJD TIVOU"
:OB$(22)="TQPDL'T USJDPEEFS":DI$(0)="OPSUI":DI$(1)="FBTU":DI$(2)
="TPVUI":DI$(3)="XFTU":DI$(4)="VQ":DI$(5)="EPXO"
200 OB$(23)="UIF EJMJUIJVN DSZTUBN QPXFS TUBUJPO -- UIF DSZTUBNT
 BSF
CVTFE BOE POMZ QSPWJEJOH B GSBDUJPO PG OPSNBN POFSHZ NFWFNT.":OB
$(24)="UIF BVYJNJBSZ DPOUSPN QBOFN -- B LFZ DPHQPOFOU
IBT CFFO SFNPWFE JO UIF DFOUFS PG UIF DJSDVJU"
205 OB$(25)="B 3E DIFTT TFU":OB$(26)="TUBS DIBSUT"
210 VB$="!!!OPSFBTTPVXFTVQ!EPXIFNJOWTDPRVJNPPBP!BFUESPTBZUISGJSQ
SFSFBJOTJOR":FORI=1TO21:VB$=RIGHT$(VB$,LEN(VB$)-3):FORJ=1TO3:VB$
(I)=VB$(I)+CHR$(ASC(MID$(VB$,J,1))-1):SET(0,I+5):SET(1,I+5):NEXT
J,I
215 FORI=0TO1:FORJ=27TO29:SET(I,J):NEXTJ,I
220 NN$="!!!IFOFSDFNNCVUUCVUUCVUUTJBOTJHOTJHOTJHOTJHOTJBOTQPDLMJOLMJ
OLMJOLMJOOSJCDSZTNBOVIZQPQIBTDPNNTIVOUSJD"
230 FORI=0TO22:NN$=RIGHT$(NN$,LEN(NN$)-4):FORJ=1TO4:NN$(I)=NN$(I
)+CHR$(ASC(MID$(NN$,J,1))-1):SET(124,I+6):SET(125,I+6):NEXTJ,I:P
L=1:SP=0:XE=-1:CR=0:SH=0:DE=-1:TT=0:SET(124,29):SET(125,29):TO=
1
240 DD$(1)="CSJEHF":DD$(2)="QFSTPOOPM TFDUJPO":DD$(3)="UFDIOJDBN
 EFQBSUNFOUT":DD$(4)="TFDVSJUZ TFDUJPO":DD$(5)="FOBJOFFSJOH EJWJ
TJPO":NN$(25)="CHES":NN$(26)="CBAR"
250 FORTI=1TO1000:NEXTTI
500 CLS:PRINT"ZPV ";:IFSPTHENPRINT"BOE TQPDL BSF ";ELSEPRINT"BSF
 ";
510 PRINTDS$(PL):PRINT:PRINT"FCWJPVT FYJUT BSF:":FORJ=0TO5:IFDI(
PL,J)<>0THENPRINTDI$(J);"   ";:NEXT:PRINTELSENEXT:PRINT
515 IFPL=21THENPRINT:PRINT"ZPV DBO TFF UIF GPMMPXJOH PCKFDUT:":P
```

Program continues

OUR PRICES, SELECTION AND SAME-DAY SHIPPING MAKE US COMPETITIVE. OUR PEOPLE MAKE US EXPERTS.

Red Baron.
Home of the Nation's Largest Computer Printer Inventory.

NEC 8023
Outstanding Graphics, Print Quality & Performance



144 x 160 dots/inch • Proportional Spacing • Lower case descenders • N x 9 dot matrix • 8 character sizes • 5 unique alphabets • Greek character set • Graphic symbols • 100 CPS print speed • Bi-directional logic-seeking • Adjustable tractors • Single-sheet friction feed • Vertical & horizontal tabbing

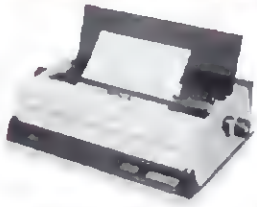
NEC 8023
Dot Matrix . . . . . List $795 **$Call**

IDS Paper Tiger Prism 80/132
Affordable Color, Speed

Dot Resolution Graphics • 9-wire staggered printhead • Lowercase decenders • Over 150 CPS • Bi-directional, logic-seeking • 8 character sizes • 80-132 columns • Hi-res dot graphics • Proportional spacing • Text justifications • Optional Color

Prism 80. . . . . List $999
Prism 132. . . . . List $2095 **$Call**

Smith Corona TP-1
Daisy Wheel Printer For Under $900



A real character printer • Standard serial or parallel data interface • Drop-in ribbon • 144 WPM • Various type fonts available • Loads paper like typewriter • Handles single sheets for forms • Compatible with most micro computers

Smith Corona TP-1 . . . . . List $885 **$Call**

Televideo CRT's
Price, Performance & Reliability

910	List $699	$600
925	List $995	$750
950	List $1195	$970

Other Quality Printers at Red Baron

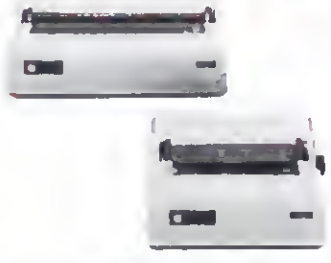
	List	Discount
Anadex OP-8500A	$1725	$Call
Anadex OP-9620	$1845	$Call
C. Itoh 8510 Prowriter	$795	$Call
C. Itoh F-10	$1995	$Call
Diablo 630/S	$2995	$2570
QUME Sprint 9/45	$2475	$2150
NEC Spinwriter RO		
Serial Parallel 77xx	$3055	$2575
Parallel 55xx	$2290	$1975

The Epson Series
High-Quality Printers at a Low Price.

Epson MX80 . . . . . List $645
Epson MX80FT . . . . . List $745
MX100 . . . . . List $998 **$Call**

Full Line of Epson Acessories.

The Okidata Series
Hi-Res & TRS 80 Block Graphics



120 CPS • 9 x 9 Matrix • Bidirectional logic seeking printing • Lower case descenders • Four print styles • Optional Hi-Res Graphics

Okidata 82A	List $649	$400
Okidata 83A (w/Tractor) .	List $895	$745

Interface Equipment
Complete Stock of Options, Cables and Accessories

GRAPPLER APPLE INTERFACE	$175
OCS APPLE SERIAL Interface & Cable	$150
ORANGE INTERFACE for Apple II Parallel Interface Board and Cable	$110
NOVATION D-CAT direct connect modem	$150
COMPLETE STOCK OF EPSON ACCESSORIES	$Call
CUSTOM PRINTER CABLES FOR Apple, Atari, IBM, TRS-80 (all models)	$Call
RAMEX MICROBUFFER	$300
PRINTER STANDS Large / Small	$99 / $39
PRINTER RIBBONS—Most Types	$Call

Our People, Our Product: Both Are Specialized.

Red Baron is an organization of computer printer specialists. They know the capabilities of each printer, and how to match one to your exact need. Call for expert consultation today!

Member Better Business Bureau

Here's How To Order:

Phone orders are welcome, same-day shipment on orders placed before 11:00 a.m. Free use of MasterCard and Visa. COD's accepted. Personal checks require 2 weeks clearance. Manufacturer's warranty included on all equipment. Prices subject to revision.

Call For Free Catalog:

1-800-854-8275

CA, AK, HI (714) 630-3322

Red Baron™ COMPUTER PRODUCTS

1100 N. TUSTIN #207
ANAHEIM, CA 92807

-275

©1982 Red Baron Computer Products

Coordinated Business Software

D.B. Software Co. announces a new line of coordinated business software designed for the Model III TRS-80. The BASE system consists of a **General Ledger System** with **Accounts Receivable** and **Accounts Payable**. Other modules can be purchased and added as needed.

BASE System (GL-AR-AP)	$200.00
Coordinated Modules:	
Payroll	$ 75.00
Order Entry	$125.00
Inventory	$129.95
Purchase Order Entry	$125.00
Inventory (special for Auto Parts Suppliers)	$129.95

Also available:

Job Costing with GL and AP (Payroll optional)	$500.00
Mailing Lister	$100.00

Coming soon:
Apartment Management System, Fixed Assets System, Manufacturing Inventory Management System

Send S.A.S.E. for more information

D.B. Software Co.
11840 NE Brazee, Portland, OR 97220
Phone (503) 255-7735
DEALER INQUIRIES INVITED

TRS-80 is a trademark of Tandy Corp.

410

Program continued

```
RINT"UIF POUJSP TIJQ'T TUPSPIPVTP PG TVQQMJPT.":GOTO525
520 K=0:PRINT:PRINT"ZPV DBO TPF UIF GPMMPXJOH PCKFDUT:":FORJ=1TO
26:IFOB(J)=PLTHENK=1:PRINTOB$(J):NEXTJELSENEXTJ:IFK=0PRINT"OPUIJ
DB"
525 IFOB(11)=PLOROB(12)=PLOROB(13)=PLOROB(14)=PLTHEN3000
530 IFKEANDSPANDPL=20THENPRINT"
TQPOL THET -- OBQUBJO, NZ USJOPSEPS JDEJDBUPT B MBSEP OVMCPS
PG LMJOHPOT UP UIF FBTU.  UPP NBOZ GPS VT UP EFGPBU XJUI
KVTU IBOE QIBTPST."
540 IFKEANDPL=30THENPRINT"
ZPV BSP TVSSPVOEPE CE B TRVBESPO PG LMJOHPO TFNEJPST.
ZPV IBWF UJNF GPS POMZ POF BOUJPO CFGPSP UIPZ GJSP!":GOTO3500
1000 GOSUB4000:PRINT:POKEPX,0:CM$="":PRINT"COMMAND ? ";:PP=PEEK(
16416)+256*PEEK(16417)-15360:GOSUB5000:CM$=CM$+"     ":POKEPX,61
1005 VB$=LEFT$(CM$,3):NN$="":FORI=1TOLEN(CM$)-4:IFMID$(CM$,I,1)=
" "THENNN$=MID$(CM$,I+1,4):I=255
1010 NEXTI:VB=0:FORJ=1TO21:IFVB$=VB$(J)THENVB=J
1020 NEXTJ:IFVB=0THENPRINT"OBO ZPV SFQFBU UIBU ";:GOTO1000
1030 NN=-1:FORJ=0TO26:IFNN$=NN$(J)THENNN=J
1040 NEXTJ:IF(NN=-1ANDVB>12)ANDVB<>15THENPRINT"OBO ZPV SFQFBU UI
BU ";:GOTO1000
1050 ONVBGOTO1100,1100,1100,1100,1100,1100,1190,1400,1500,1600,5
00,1700,1000,1900,2000,2100,2200,2300,2400,2500,2600
1100 IFDI(PL,VB-1)<>0THENPL=DI(PL,VB-1):GOTO500
1110 PRINT"ZPV DBOOPU BP JO UIBU EJSFDUJPO.":GOTO1000
1190 IFPL=4THEN1240
1200 IFNOTSPTHENPRINT"TPSSZ, DBQUBJO, ZPV BSP PO ZPVS PKO.":GOTO
1000ELSEONPLGOSUB1210,1220,1230,1240,1220,1220,1250,1260,1220,12
20,1270,1270,1270,1250,1220,1220,1220,1220,1220,1220,1200,1220,1
220,1220,1220,1220,1250,1290,1220,1220,1300,1295:GOTO1000
1210 PRINT"QFSIBQT ZPV XPVME HJLF UP UBLF B OBQ?":RETURN
1220 PRINT"J TFF OPUIJOH PVU PG UIF PSEJOBSZ, OBQUBJO.":RETURN
1230 PRINT"ZPV VTVBMMZ TBZ <<FOFSHJ[F>> BU UIJT QPJOU, DBQUBJO."
:RETURN
1240 PRINT"XJUIPVU B DPNNVOJDBUPS ZPV BSP USBQQFE PO UIJT QMBOPU
 GPSFWFS.":RETURN
1250 KH=0:FORJ=11TO14:IFOB(J)=PLTHENKH=1:NEXTJELSENEXTJ
1255 IFKB=1THENPRINT"J TVHBPTU ZPV GJSP B QIBTFS.":RETURNELSE122
0
1260 IFOB(15)=0THENPRINT"EP ZPV UIJOL UIJT DSPBUVSF OPVME CF VTF
GVM?":RETURNELSE1220
1270 PRINT"EP ZPV XBOU NF UP QSPTT UIF CVUUPO?":RETURN
1280 PRINT"BMSPTU BOZ FRVJQNPOU ZPV SPRVJSF JT BWBJMBCMF.":RETUR
N
1290 IFKETHENPRINT"QFSIBQT JG XF IBE TPNFUIJOH UP GSJBIUFO UIFN
BXBZ!":RETURNELSE1220
1295 IFOB(1)=32THENPRINT"J CFHJFWF UIF LMJOHPO-FTF QISBTF GPS <<
EP ZPV TVSSPOEPS>>
JT <<USPYBFUJ>>.  QFSIBQT JG ZPV USJFE UIBU, DBQUBJO ?":RETURN
1300 PRINT"J TVHEPTU KF DPOTVMU UIF UFDIOJDBM NBOVBM.":RETURN
1400 PRINT:PRINT"ZPV BSP DBSSZJOH UIF GPMMPXJOH JUPNT:":K=0:FORJ
=15TO26:IFOB(J)=0THENPRINTOB$(J):K=1
1410 NEXTJ:IFK=0THENPRINT"OPUIJOH"
1420 GOTO1000
1500 SC=(OB(16)=0ORCR)+(OB(19)=0)+CR+SH+(OB(1)=26)+(DE=0)+(KE=0)
+SP:SC=SC*10:FORI=11TO14:IFOB(I)=-1THENSC=SC-5
1510 NEXTI:PRINT"ZPV5 TDPSP UIVT GBS JT";-SC;"%":IFSC=-100THENPR
INT"DPOESBUVMBUJPOT ... ZPV IBWF CFFO QSPHPUFE UP DPNNPEPSP!":GO
TO1600ELSE1000
1600 PRINT"XPVME ZPV HJLF UP USZ BHBJO ?":GOSUB1650
1610 CN$=INKEY$:IFCN$="Y"THENRUN5ELSEIFCN$="N"THENENDELSE1610
1620 GOSUB1650:PRINT:PRINT"ERROR CODE";ERR/2+1;"IN LINE";ERL:END

1650 POKE16414,SI:POKE16415,S2:IFPEEK(16396)=23THENPOKE16396,201
:RETURNELSEPOKE23086,1:RETURN
1700 VB$=LEFT$(NN$,3):VB=0:FORJ=1TO6:IFVB$=VB$(J)THENVB=J
1710 NEXTJ:IFVB=0THENFORJ=1TO1:GOTO1020ELSE1100
1800 IFNN<15THENPRINT"UIBU DBOOPU CF EPOF.":GOTO1000
1810 IFOB(NN)=FLANDTT<5THENPRINT"P.L.  BEE ";OB$(NN):PRINT"UP ZP
VS JOWFOUPSZ.":OB(NN)=0:TT=TT+1:GOTO1000
1815 IFOB(NN)=PLTHENPRINT"ZPV BSP OBSSZJOH UPP NVDI.  ESPQ TPNPU
IJOH.":GOTO1000
1820 IFOB(NN)=0THENPRINT"ZPV BMSFBEZ IBWF UIBU!":GOTO1000
1830 PRINT"XIPSF EP ZPV TFF UIBU?":GOTO1000
1900 IFOB(NN)<>0THENPRINT"ESPQ XIBU?":GOTO1000
1910 IFNN=16ANDOB(16)=0THENPRINT"P.L.  BT ZPV ESPQ UIFN, UIF DSZ
TUBNT TIBUUFS JOUP VTFMFTT EVTU.":OB(16)=4:TT=TT-1:GOTO1000
1920 PRINT"P.L.  ZPV IBWF ESPQQFE ";OB$(NN):OB(NN)=PL:TT=TT-1:GO
TO1000
2000 IFPL=3IFSPIFNN=0THENPRINT"TQPOL THZT -- BZF BZF OBQUBJO.":F
ORI=1TO50:PRINT"*";:FORJ=1TO50:NEXTJ,I:FORJ=1TO1000:NEXTJ:PL=4:S
P=0:GOTO500
2010 IFPL=4IFOB(20)=0IFNN=0THENPRINT"TQPDL SFTQPOET -- CFBNJOH Z
PV BCPBSE OBQUBJO.":FORI=1TO50:PRINT"*";:FORJ=1TO50:NEXTJ,I:FORJ
=1TO1000:NEXTJ:PL=3:SP=-1:GOTO500
2020 IFPL=3IFNN=0THENPRINT"ZPV OFFE TPNFPOP UP XPSL UIF DPOUSPMT
.":GOTO1000
2030 IFPL=32IFNN$="TROX"IFOB(1)=32THENPRINT"UIF OPNNBOEPS IBT TV
```

Program continues

Program continued

```
SSFOEFSFE BOE XJMM BXBJU USJBM JO UIF
CSJH.  IF IBT BMTP OPOGFTTFE UIBU UIF OSFX JT VOIBSNFE PO UIF
QMBOFU'T TVSGBOF BOE XJMM TVQQMZ USBOTQPSUFS DP-PSEJOBUFT.":OB(1
)=26:GOTO1000
2040 PRINT"P.L.  ZPV TBJE JU CVU"
2050 PRINT"OPUIJOH IBQQFOFE.":GOTO1000
2100 IFOB(NN)<>0THENPRINT"ZPV DBOOPU UISPX TPNFUIJOH ZPV EP OPU
IBWF.":GOTO1000ELSETT=TT-1
2110 IFNN=16THENPRINT"P.L.  BT B SFTVMU UIF OSZTUBMT IBWF
TIBUUPSFE JOUP VTFMFTT EVTU.":OB(16)=4:GOTO1000
2120 IFNN>16THENPRINT"P.L.":IFSPTHENPRINT"TQPDL TBZT -- B NPTU J
MMPHJDBM NPWF DBQUBJO."
2130 IFNN>16THENOB(NN)=PL:GOTO1000
2140 FORI=11TO14:IFOB(I)=PLTHENPRINT"UIF LMJOHPO XBT TP BGSBJE P
G UIF USJCCMF UIBU IF
UVSOFE BOE SBO BXBZ UP IJEF.  EPO'U XPSSZ BCPVU IJN BOZNPSF!":OB
(I)=-1:OB(15)=PL:I=15:NEXTI:GOTO1000ELSENEXTI
2150 IFOB(1)=PLTHENPRINT"UIF LMJOHPO OPNNBOEPS JT FTQFDJBMMZ CSB
WF
BOE TIBLJMZ IPMET IJT HSPVOE.":OB(15)=PL:GOTO1000
2160 IFPL=30ANDKETHENPRINT"PODF UIF LMJOHPOT SFBMJ[F UIFZ IBWF B
 USJCCMF JO UIJPS NJETU,
UIFZ UVSO BOE SVO JO BMM EJSFDUJPOT.";
2165 IPPL=30IPKEIFSPTHENPRINT"  TQPOL TBZT -- FYDFMMFOU
DBQUBJO.  ZPV NVTU IBWF SFNFNCFSFE IPX JMMPHJDBMMZ GSJHIUFOFE .
UIF LMJOHPOT BSF PG USJCCMFT."ELSEPRINT
2170 IFPL=30ANDKETHENKE=0:OB(15)=30:GOTO1000
2180 PRINT"P.L.":OB(15)=PL:GOTO1000
2200 IFNN<>19THENPRINT"ZPV DBOOPU EP UIBU.":GOTO1000
2210 IFOB(19)<>0THENPRINT"ZPV DBOOPU EP UIBU ZFU.":GOTO1000
2220 FORI=11TO14:IFOB(I)=PLTHENPRINT"P.L.":PRINTSTRING$(64,131);
:FORK=1TO10:NEXTK:PRINTCHR$(27);CHR$(30):PRINT"UIF LMJOHPO IBT C
FFO SFNPWFE.":OB(I)=-1:I=15:NEXTI:GOTO1000
2230 NEXTI:IFOB(1)=PLTHENPRINT"P.L.":PRINTSTRING$(64,131);:FORX=
1TO10:NEXTK:PRINTCHR$(27);CHR$(30):PRINT"UIF DPNNBOEPS IBT CFFO
SFNPWFE.":IFSPTHENPRINT"TQPOL TBZT -- IJHIMZ JMMPHJDBM UP LJMM B
O VOBSNFE NBO, DBQUBJO.":OB(1)=-1:GOTO1000ELSEOB(1)=-1:GOTO1000
2240 PRINT"P.L.":PRINTSTRING$(64,131);:FORK=1TO10:NEXTK:PRINTCHR
$(27);CHR$(30):IFSPTHENPRINT"TQPDL TBZT -- XIZ XBTUF WBMVBCMF QI
BTFS OIBSHF, DBQUBJO?":GOTO1000ELSE1000
2300 IFNN<20RNN>4THENPRINT"EP XIBU, DBQUBJO?":GOTO1000
2310 IFPL<11ORPL>13THENPRINT"XIBU CVUUPO, DBQUBJO?":GOTO1000
2320 IFPL=12ANDKETHENPRINT"UIF OPNQVUFS SFTQPOET -- TPOTPST JOEJ
DBUF POF IVNBJOPJE MJGF
GPSN PO CPBSE, NBOZ LMJOHPO MJGF GPSNT, ... BOE POF WVMDBO.":GOT
O1000
2330 IFPL=12THENPRINT"UIF OPNQVUFS SFTQPOET -- TFOTPST JOEJDBUF
POF IVNBOPJE MJGF
GPSN BOE POF WVMDBO MJGF GPSN PO CPBSE.":GOTO1000
2340 IFPL=13THENPRINT"UIF OPNQVUFS SFTQPOET -- UIF FOUFSQSJTF JT
 JO PSCJU BSPVOE
QMBOFU UFJSBT ØØ ... B OMBTT N QMBOFU ... PYZHFO - OJUSPHPO
BUNPTQIFSF ... SJOI JO OSZTUBMMJUF NJOFSBMT."
2350 IFPL=13IFOEPRINT"UIF FOUFSQSJTF XJMM CFBJO UP CVSO VQ JO UI
F BUNPTQIFSF PG UIF
QMBOFU WFSZ TPPO VOMFTT JNQVMTF FOHJOFT BSF GJSFE."
2360 IFPL=13THEN1000
2370 IFPL=11IFSHIFCRTHENPRINT"UIF TIJO TIBLFT WJPMFOUMZ ...
UIF OPNQVUFS SFTQPOET -- TUBCMF PSCJU BOIJFWFE !":DE=0:TD!=1:GOT
O1000
2380 PRINT"OPUIJOH IBQQFOFE.":GOTO1000
2400 IFNN=9AND(INT(PL/5)*5=PLANDPL<26)THENPRINT"JU TBZT:
TUBSTIJO FOUFSQSJTF -- ODO 1701":PRINT"EFOL";PL/5;" -- ";OO$(PL/
5):GOTO1000
2410 IFNN=17ANDOB(17)=0THEN2420ELSEPRINT"SFBE XIBU, OBQUBJO?":GO
TO1000
2420 IFPL=11THENPRINT"JU TBZT UP DIFDL CPUI UIF EJMJUIJVN OSZTUB
MT BOE UIF DPOUSPMT
JO UIF FOHJOFFSJOH TFDUJPO.":GOTO1000
2430 IFPL=21ANDOB(21)=PLTHENPRINT"JU TBZT UIJT TIVOU JT JNQPSUBO
U JO
UIF FOHJOFFSJOH OPOUSPM NFOBOJTN.":GOTO1000
2440 IFPL=31THENPRINT"JU TBZT JOTFSU UIF OSZTUBMT JOUP UIF QPXFS
 TUBUJPO.":GOTO1000
2450 IFPL=32THENPRINT"JU TBZT JOTUBMM UIF TIVOU JO UIF OPOUSPM Q
BOFM.":GOTO1000
2460 PRINT"JU EPFT OPU NFOUJPO BOZUIJOH PG WBMVF JO UIJT TJUVBUJ
PO.":GOTO1000
2500 IFPL<31THENPRINT"IFSF, OBQUBJO?":GOTO1000
2510 IFPL=31IFOB(16)=0IFNN=16IFCRPRINT"UIBU JT OPU OFDFTTBSZ OPX
, DBQUBJO.":GOTO1000
2520 IFPL=31IFOB(16)=0IFNN=16IFCR=0THENPRINT"B MPX WJCSBUJPO CFH
JOT ...
QPXPS MFWFMT OPX BU";90+RND(9)+RND(0);"%":CR=-1:TT=TT-1:OB(16)=4
:OB(23)=-1:GOTO2560
2530 IFPL=32IFOB(21)=0IFNN=21IFSHPRINT"UIBU JT OPU OFOFTTBSZ OPX
, OBQUBJO.":GOTO1000
```

Program continues

ANNOUNCING

FORTHWRITE

AN OUTSTANDING WORD PROCESSOR FOR YOUR TRS-80 MODEL I OR III OR IBM PERSONAL COMPUTER!

If you need to type any of the following sorts of documents: business or personal letters, form letters, proposals and estimates, term papers and theses, newspaper and magazine articles, books, stage scripts — then FORTHWRITE is the tool you want. Designed for easy and effective use by computer novices, unusual power and flexibility for the advanced user's most complex tasks, all with instant response time.

FORTHWRITE combines the power of MMSFORTH with the best features of SCRIPSIT (trademark of Tandy Corp.) and WORDSTAR (trademark of MicroPro). Learning becomes easy thanks to on-line Help screens, excellent keyboard mnemonics and screen prompts, a good manual and sample documents. "Include" feature permits internal chaining of documents, text blocks (and address files), custom keyboard entries, etc. Outdenting, multiple-line odd and even headers and footers, screen windowing to 255 columns, MORE

Standard serial and parallel printer drivers with in-line printer control codes are provided, plus TRUE PROPORTIONAL drivers with tabbing for the NEC Spinwriter and TRS-80 Daisy Wheel II printers, subscript, superscript and boldprint on the above and Epson/IBM printers, a printer spooler and MUCH more

Print capacity is limited only by disk space (multiple documents can be chained at printout and up to 8 disk drives can provide contiguous data space), while editing takes advantage of the exceptional speed of in-memory operation. A print-to-disk option permits examination of formatted output without hardcopy

FORTHWRITE V1.0 (requires MMSFORTH V2.0/2.1, 2 drives & 48 K RAM) $175.00*

MMSFORTH

THE PROFESSIONAL FORTH SYSTEM FOR TRS-80 AND IBM PC

(Thousands of systems in use)

MMSFORTH Disk System V2.0 (requires 1 drive, 32 K RAM).
For Radio Shack TRS-80 Model I or III ... $129.95*
For IBM Personal Computer (80-col. screen) $249.95*

AND MMS GIVES IT PROFESSIONAL SUPPORT

Source code provided
MMSFORTH Newsletter
Many demo programs aboard
MMSFORTH User Groups
Inexpensive upgrades to latest version
Programming staff can provide advice, modifications and custom programs, to fit YOUR needs

OTHER MMSFORTH PRODUCTS:

The DATAHANDLER database management sys ... $69.95*
FORTHCOM communications program ... $39.95*
MMSFORTH UTILITIES Diskette ... $39.95*
MMSFORTH GAMES Diskette ... $39.95*
MMSFORTH GENERAL LEDGER ... $350.00*
TRADESHOW Commodities Exchange smart terminal ... $995.00*

FORTH BOOKS AVAILABLE

MMSFORTH USERS MANUAL - without Appendices, for non-owners ... $17.50*

STARTING FORTH - best companion to our manual ... $15.95*

THREADED INTERPRETIVE LANGUAGES - advanced, excellent analysis of MMSFORTH-like language ... $18.95*

PROGRAM DESIGN & CONSTRUCTION - Intro to structured programming, good for Forth ... $13.95*

FORTH-79 STANDARD MANUAL - official reference to 79-STANDARD word set, etc ... $13.95*

FORTH SPECIAL ISSUE, BYTE Magazine (Aug 1980) - we stock this collector's item for Forth users and beginners ... $4.00*

* - ORDERING INFORMATION: Software prices include manuals and require signing of a non-transferrable single system, single-user license. Describe your Hardware. Add $2.00 S/H plus $3.00 per MMSFORTH and $1.00 per additional book; Mass. orders add 5% tax. Foreign orders add 20%. UPS COD, VISA & M/C accepted; no unpaid purchase orders, please.

Send SASE for free MMSFORTH information
Good dealers sought

Get MMSFORTH products from your computer dealer or

MILLER MICROCOMPUTER SERVICES (M8)
61 Lake Shore Road, Natick, MA 01760
(617) 653-6136 ↵137

↵See List of Advertisers on page 338

Program continued

```
2540 IPPL=32IPDB(21)=0IPNN=21IPSB=0TBENPRINT"B BSPPO QBOPM NJHIU
 BMPXT ...
BVYJMJBSZ DPOUSPM DPX PQPSBUJPOBM.":OB(24)=-1:TT=TT-1:SH=-1:OB(2
1)=21:GOTO2560
2550 PRINT"ZPV DBOOPU EP UIBU, DBQUBJO.":GOTO1000
2560 IPCRANDSBTBENTDI=-17-RND(3)-RND(0):GOTO1000ELSE1000
2600 IP(NN=10ORNN=10)IPOB(10)=26IPOB(10)=0THENPRINT"P.L.  TQPDL
BXBLPOT BOE TBZT -- J BN JOEPCOPE UP CPUI ZPV BOE
ES. NDOPZ. J 0N XPMM FOPVHI UP BTTJTU ZPV OPX.":SP=-1:OB(10)=-1:
GOTO1000
2610 PRINT"OPU OPX, DBQUBJO.":GOTO1000
3000 IPOB(19)<>0ANDOB(15)<>0THENPRINT:PRINT"XJUIPVU B QIBTPS, ZP
V NVTU TVSSPOEFS.":GOTO1600
3010 PRINT:POKEPX,0:CM$="":PRINT"COMMAND ? ";:PP=PEEK(16416)+256
*PEEK(16417)-15360:GOSUB5000:CM$=CM$+STRING$(10,32):POKEPX,61:C2
$=LEFT$(CM$,10)
3020 C3$=VB$(16)+"OW "+NN$(15):IPC2$=C3$THENIPOB(15)=0THENTT=TT-
1:GOTO2140ELSEPRINT"XIBU USJCCMF?  ZPV IBWP CPPO UBLPO DBQUJWF":
GOTO1600
3030 C3$=VB$(17)+"E "+NN$(19)+"E":IPC2$=C3$THEN2220ELSEPRINT"UPP
 TMPX, OBQUBJO.  ZPV IBWP CPPO UBLPO DBQUJWF":GOTO1600
3500 PRINT:POKEPX,0:CM$="":PRINT"COMMAND ? ";:PP=PEEK(16416)+256
*PEEK(16417)-15360:GOSUB5000:CM$=CM$+STRING$(10,32):POKEPX,61:C2
$=LEFT$(CM$,10):IPOB(15)<>0THEN3520
3510 IPC2$=VB$(16)+"OW "+NN$(15)THENTT=TT-1:GOTO2160
3520 PRINT"UPP TMPX, DBQUBJO. ZPV IBWP CPPO DBQUVSPE!
UIF FOUFSQSJTF IBT CPPO MPTU!":GOTO1600
4000 IFTD1>0THENRETURNELSETO1=TO1+1+RND(0)
4010 IFTO1>0THENPRINT"UPP MBUP, DBQUBJO!  OIP FOUFSQSJTF XJNN TP
PO CVSO
VQ JO UIP QMBOPU'T BUNPTQIFSF.  BPPECZP, DBQUBJO!":GOTO1600
4020 IPSPTHENPRINT"TQPDL TBZT -- POMZ";-TO1;" NJDVUPT VOUJM PSCJ
U EPDBZT"
4030 RETURN
5000 PRINT@PP+LEN(CM$),CHR$(143);:PORXE=1TO30:WY$=INKEY$:IPWY$="
"THENNEXT:PRINT@PP+LEN(CM$)," ";:PORXE=1TO30:WY$=INKEY$:IPWY$=""
THENNEXT:GOTO5000
5010 IPWY$=CBR$(13)THENPRINT@PP+LEN(CM$)," ":RETURN
5020 IPASC(WY$)=0ANDLEN(CM$)>0THENCM$=LEPT$(CM$,LEN(CM$)-1):PRIN
T@PP,STRING$(LEN(CM$)+2,32);:PRINT@PP,CM$;:GOTO5000ELSEIFASC(WY$
)=0TBEN5000
5030 CM$=CM$+WY$:PRINT@PP,CM$;:GOTO5000
5500 CLS:PRINT@120,"CAPTAIN'S LOG -- STARDATE 4295.2  -- WHERE A
M I ?  WHAT HAS
BAPPENED TO MY CREW ?  I AWOKE MOMENTS AGO TO FIND THAT I HAD
BEEN DEPOSITED UNCONSCIOUS IN MY QUARTERS BY AN UNKNOWN EMEMY."
5510 PRINT"I NAVE TRIED REPEATEDLY TO CONTACT MY CREW BUT NONE R
ESPONDS --
SPOCK, SCOTTY, MCCOY, SULU, CHECKNOV ...  THE ENTERPRISE IS
EERILY QUIET, THE SILENCE BROKEN ONLY BY A SNATCH OF CONVERSA-
TION IN A STRANGE LANGUAGE SPOKEN IN THE CORRIDOR OUTSIDE MY"
5520 PRINT"CABIN.  COULD THIS BE THE KLINGON'S FINAL VICTORY ?":
PRINT:PRINT"YOU ARE THE CAPTAIN OF THE STARSHIP ENTERPRISE.  PRE
SS ENTER";PRINTTAB(20)"AND WELCOME TO ... ":PP=807:CM$="":GOSUB5
000:RETURN
```

Program Listing 2

```
10 ML$="THIS SAVES ROOM FOR PRINT SCRAMBLER!"
20 J=PEEK(VARPTR(ML$)+1)+256*PEEK(VARPTR(ML$)+2):J=J+65535*(J>32
767):FORK=JTOJ+35:READX:POKEK,X:NEXTK:DATA221,11B,3,221,102,4,21
0,154,4,221,126,5,103,40,1,119,121,254,120,210,166,5,254,32,210,
6,5,254,64,210,125,4,61,195,125,4
30 S1=PEEK(16414):S2=PEEK(16415):POKE16414,PEEK(VARPTR(ML$)+1):P
OKE16415,PEEK(VARPTR(ML$)+2):IFPEEK(16396)=201THENPOKE16396,23EL
SEPOKE23006,0
40 ONERRORGOTO100
50 CLS
60 READA$:IFA$="****"THEN100
70 FORI=1TOLEN(A$):PRINTMID$(A$,I,1);:FORJ=1TO10
80 B$=INKEY$:IFB$=""THEN90ELSEIFASC(B$)=2THEN100
90 NEXTJ,I:PRINT:GOTO60
100 POKE16414,S1:POKE16415,S2:IFPEEK(16396)=23THENPOKE16396,201E
LSEPOKE23006,1
```

Program continues

MTI AUTHORIZED SALES AND SERVICE CENTERS

Anchorage, AK	(907) 333-8322
Rogers, AR	(501) 636-9168
Mesa, AZ	(602) 833-8949
Phoenix, AZ	(602) 241-1865
Tempe, AZ	(602) 831-5376
Anaheim, CA	(714) 773-0240
Burbank, CA	(213) 841-4210
Covina, CA	(213) 332-4088
Goleta, CA	(805) 967-7628
Inglewood, CA	(213) 673-3295
Lancaster, CA	(805) 942-5747
Montclair, CA	(714) 626-4813
Northridge, CA	(213) 886-9200
Orange, CA	(714) 771-0880
Pacheco, CA	(415) 689-2260
Placerville, CA	(916) 622-4640
Port Hueneme, CA	(805) 985-2328
Redondo Beach, CA	(213) 370-5556
San Diego, CA	(714) 275-4243
San Jose, CA	(408) 946-1265
Santa Monica, CA	(213) 393-5785
Vallejo, CA	(707) 554-4933
Walnut, CA	(714) 594-9760
Westlake Village, CA	(213) 706-0333
Colorado Springs, CO	(303) 630-3334
Grand Junction, CO	(303) 434-3618
Groton, CT	(203) 445-5166
Wilmington, DE	(302) 762-0227
Hollywood, FL	(305) 981-1011
Mary Esther, FL	(904) 243-5793
Panama City, FL	(904) 769-5887
Tampa, FL	(813) 247-6023
Norcross, GA	(404) 449-8982
Honolulu, HI	(808) 521-7312
Belleville, IL	(618) 277-2354
Collinsville, IL	(618) 345-5068
Decatur, IL	(217) 429-8510
Oak Park, IL	(312) 386-3323
Bettendorf, IA	(319) 355-2641
Buckingham, IA	(319) 478-2826
Shreveport, LA	(318) 865-7189
Hopkinton, MA	(617) 435-4772
Springfield, MA	(413) 737-4562
Anoka, MN	(612) 427-5783
Minneapolis, MN	(612) 869-3245
Cameron, MO	(816) 632-6528
Joplin, MO	(417) 782-0880
Bozeman, MT	(406) 586-2511
Great Falls, MT	(406) 727-1615
Missoula, MT	(406) 549-9715
Raleigh, NC	(919) 755-1175
West Milford, NJ	(201) 728-8080
Jericho, NY	(516) 333-2266
New Rochelle, NY	(914) 235-4444
Syracuse, NY	(315) 474-1442
Troy, NY	(518) 273-8411
White Plains, NY	(914) 761-9283
Las Vegas, NV	(702) 870-4138
Toledo, OH	(419) 535-5897
Oklahoma, OK	(405) 842-4480
Tonkawa, OK	(405) 628-2693
Portland, OR	(503) 281-7640
Salem, OR	(503) 581-8056
Mitchell, SD	(605) 996-6030
Missouri City, TX	(713) 499-5241
San Angelo, TX	(915) 658-3781
Anacortes, WA	(206) 293-5154
Cheyenne, WY	(307) 632-9132
FOREIGN COUNTRIES	
Buenos Aires, ARG	(54) 132-1858
Brisbane, AUS	657-8023
Lubbek, BELGIUM	1863-2452
Burnaby, BC	(604) 522-9877
Ottawa, CAN	(613) 741-7937
Helsinki, FIN	9064-4116
Courbevoie, FRANCE	341-773-5493
Holm, GER	4103-7393
Tel Aviv, ISRAEL	325-8535
Florence, ITALY	45-4319
Singapore	220-7102
Capetown, SA	2145-1047
Papeete, TAHITI	2-5447
TaiChung, TAIWAN	4228-5523
Huamhak Bangkap, THAIL	314-1161

247 MICROCOMPUTER TECHNOLOGY, INC

$2495 PUTS YOU IN BUSINESS.

FREE SOFTWARE

Accounting Package:

Accounts Receivable, Accounts Payable, General Ledger, Inventory/Sales Analysis, Payroll, Audio Self-Learning Cassette, Games, Education Software, DOS Plus 3.3.

Word Processing:

Discount certificate entitling the purchaser to NEW SCRIPT by Pro Soft, complete word processing software.

Introducing the M.T.I.® BUSINESS Computer. We believe in offering you the best in complete, low cost computing.

M.T.I MOD III PLUS B/140. We have taken the basic MODEL III, expanded the memory to 48K and added our M.T.I. double density, dual drive system. All M.T.I. BUSINESS computers include 4 Mhz speed-up for remarkable fast processing, a RS-232 Interface, Anti-Glare screen and cooling unit.

LOW PRICE. M.T.I. BUSINESS computers are priced from $2495. As an added incentive, we will give you a business software package **FREE** with the purchase of a MOD III PLUS BUSINESS computer. The software package has a retail value of $1588.00.

All of this for $2495.

Other Models Available:

MOD III PLUS 240-B. Same as the MOD III B/140 but has double storage capacity and dual headed 40 track drives.

MOD III PLUS 280-B. Has 1.5 Megabytes storage and 2 dual headed 80 track double density disk drives.

MOD III/WINCHESTER-B. Our largest business computer system. 8.2 megabytes of storage. Includes a 7.5 megabyte Winchester hard disk and 80 track dual head disk head.

OPTIONS:

- LETTER QUALITY PRINTER
- WINCHESTER CP/M 2.2

WANT MORE? For more information call any of our authorized sales centers.

- Immediate Availability
- 90 Day Warranty
- One Year Extended Warranty Available
- Local Dealer Service

U.S. PRICES F.O.B. SANTA ANA CALIFORNIA AND MAY VARY BY AREA

CP/M is registered trademark of Digital Research, Inc.
TRS-80® is a registered trademark of Tandy Corp.
M.T.I. is a registered trademark of Microcomputer Technology, Inc.

MICROCOMPUTER TECHNOLOGY INC.
3304 W. MACARTHUR, SANTA ANA, CA 92704
(714) 979-0923 • TWX 910-595-1902 MTISNA

"This program is a last resort for extremely confused adventurers . . ."

The error trapping routine at line 35 will help you debug the program. When it encounters an error, it performs the quit routine, and the error identification number end line ere displayed.

Three other comments are in order. When the line listing suddenly drops to the line below before reaching the right mergin, use the down arrow key. Also, my printer substitutes an open bracket for the up arrow. Make that substitution when you see the bracket.

I delete line 29 after it's executed. The first time you run the program the string ML$ in line 20 is altered by POKEing the numbers in the date statement of line 29. Once this change is made, the program no longer needs line 29 and deletes it. This ceuses the TRS-80 to stop execution and return to the ready message. Simply run the program egain to play the game; this time there will be no pause et line 29.

You can now save the revised program because the effects of line 29 have been left behind in line 20. List line 20 and see how it has changed.

Program Listing 2 contains the solution

Program continued

```
110 DATAQSFTT UIF CSFBL LFZ XIFO ZPV IBWF TFFO FDPVHI!
120 DATAQSPDFFE OPSUI GSPN ZPVS DBCJO JOUP UIF IBMMX82. IFBE XFT
U VOUJM
130 DATAZPV DPNF UP UIF UVSCPMJGU FOUSBODF.  FOUFS CZ IFBEJDH OP
SUI
140 DATABOE HP VQ. FYJU UIF MJGU UP UIF FBTU BOE FYQMPSF UIF CSJ
EHF.
150 DATAGFFM GSFF UP QSFTT CVUUPDT BOE SFDFJWF UIF WBSJPVT SFQPS
UT.
160 DATAHP CBDL UP UIF MJCU BOE HP EPXO UXP MFWFMT.  FYJU UIF UV
SCPMJGU
170 DATABOE IFBE FBTU VOUJM ZPV DPNF UP UIF TJOL CBZ.  UBLF UIF
IZQP
180 DATABOE SFUVSO UP UIF UVSCPMJGU.  HP EPXO POF NPSF MFWFM BOE
 UVSO
190 DATAXFTU BGUFS FYJUJDH UIF MJGU.  DPOUJDVF XFTU VOUJM ZPV GJ
DE UIF
200 DATAXBSFIPVTF. ZPV XJMM OFFE B QIBTFS BDE DPNNVOJDBUPS JNNFE
J@UFMZ
210 DATAHP OPSUI PVU PG UIF XBSFIPVTF BOE UIFO DPOUJOVF FBTU.  Z
PV XJMM
220 DATAFODPVOUFS B LMJOHPO HVBSE CVU GJSJOH ZPVS QIBTFS XJMM EJ
TQPTF
230 DATAPG IJN. TQPDL'T USJDPSEFS JOEJDBUFT IF JT DMPTF CZ BOE P
OF NPSF
240 DATATUFQ FBTU GJDET IJN VODPTDJPVT JO UIF CSJH.  JOKFDU UIF
 IZQP
250 DATABOE IF XJMM CF SFWJWFE BOE IFMQ ZPV.  SFUVSO UP UIF FOUS
BODF
260 DATAUP UIF UVSCPMJGU BOE HP VQ.  FYJU PO EFDL 3 BOE IFBE FBT
```

Program continues

COPY MODEL III, SCRIPSIT / VISICALC®
Only $20

Works with all model III Visicalc/Scripsit and allows unlimited backups of master disks. Works even if you're already backed up twice. Simple, 17 line program.

And look at these other outstanding values!

APPARATS NEWDOS/80® , 2.0 $129.95

Convert Model I Scripsit and Visicalc to Model III, plus: Renumber program lines -move program lines - move blocks of program lines - duplicate program lines - selective variable clearing - program single stepping - memory sort multi-dimensioned arrays - swap variables - read and write to model I disks - reference keywords - spool printing - change disk speeds - disable BREAK and CLEAR - Much, much more!

FREE "Laymen's Guide to Newdos 80" included with this purchase.

HAYES SMARTMODEM®.. $249.95

Talk with other computers over regular telephone lines SMARTMODEM can auto dial - auto answer - repeat - allow for audio monitoring - programmable - is FCC approved direct-connect - full or half duplex capability, 0-300 baud - RS-232C interface - seven status LED's

VERBATIM® DATA-LIFE DISKETTES

5" diskettes come in a reusable plastic storage box

Use VISA - Mastercard Money Orders
Allow 2 weeks for personal checks.
Kansas residents add 3 5% sales tax

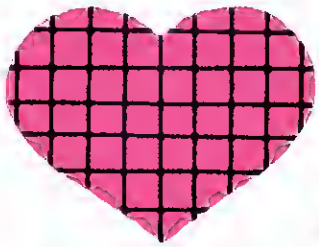
ST80 III®..$129.95

Smart terminal communications package Allows file uploading/downloading Emulates many different terminals Total operator control (Written by Lance Micklus)

FREE Catalog price list

of all Sales Data Direct-Order merchandise available upon request Super prices Rapid delivery . Quality products.

SALES DATA, INC.
526 E. 4th Hutchinson, Kansas 67501
316/665-3611
Dealer Inquiries Invited.
Phone or write Sales Data, Inc ✓ 142

IF YOU LIKED PROFILE II...
YOU'LL  DATA ACE✓

power up your TRS-80™ with ...

Complete Data Independence . . . change your files and your programs will still run. Define your fields once in your data dictionary and they can be used in any file by any program.
Not so in Profile II.

Easier Data Entry . . . **DATA ACE✓** allows you to enter data as soon as the files are defined. With Profile II you have to set up a screen.

Faster and Better Inquiries . . . DATA ACE✓ has an English-like query language so you can search several files at once in your data base for the exact information you want.
Profile II doesn't let you.

More Help . . . DATA ACE✓ validates each field as it is entered and Help text tells you what you did wrong.
Profile II gives no help.

Build Complete Systems . . . DATA ACE✓ includes its own programming language; more powerful than BASIC and much faster. It can access many files at once, checking orders against inventories for instance. Profile II can't.

More Field Formats . . . DATA ACE✓ offers alpha, alphanumeric, numeric, floating dollar, decimal point, date, ward, byte.
Profile II has only three.

DATA ACE✓ is much **more** powerful. It's the complete **Application Creation Environment.** It's a state of art relational data base manager, a structured easy to use programming language, a conversational query language both to maintain your database and to make inquiries, a screen editor, a powerful and unique operating system and application software for GL, AR, AP and manufacturing systems. In a ward it's simply **more.**

MMSFORTH is a trademark of MILLER MICROCOMPUTER SERVICES.

TRS-80 is a trademark of Tandy Corporation.

DATA ACE✓
The Power System

YES–show me more/send me

NAME _____
COMPANY _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____
TELEPHONE _____

Enclosed is my check/credit card details
(We accept Visa or M/C) exp. / /
card no ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

	TRS-80 Model II	TRS-80 Model I/III
User Guide	☐ $100 includes demo	☐ $30
Data Definition Language and Data Base Manager	☐ $600 includes CSOFORTH	☐ $245 includes MMSFORTH
Query Language	☐ $250	☐ $100

COMPUTER SOFTWARE DESIGN INC
1911 Wright Circle
Anaheim, California, 92806
(714) 634 9012

"You are cast as the captain of the Starship Enterprise."

Program continued

```
U UIPO
270 DATAOPSUI.  QIBTPS UIF LMJOHPD BOE IFBE FBTU BOE HFU UIF NBO
VBM. BP
280 DATACBUL UP UIF MJGU -- BP VQ -- BOE IFBE FBTU.  USBOTQPSU E
FXO UP
290 DATAUIF TVSGBDF PG UIF QMBOFU BOE BFU UIF EJMJUIJVN US2TUBMT
. SP-
300 DATAUVSO UP UIF TIJQ. BP XFTU UP UIP USPX'T RVBSUPST BOE UBL
F UIF
310 DATAUSJCCMF.  BP CBDL UP UIF UVSCPMJGU BOE BP EPXO UP UIF CP
UUPM
320 DATAMFWFM -- POHJOFFSJOH EPDL S.  GBDF UIF TRVBESPO PG LMJOH
POT JD
330 DATAPOBJOFFSJDB BOE UISPX UIF USJCCMF BU UIPN. SPNPNCFS -- L
MJOBPOT
340 DATABSF FYUSFNFMZ GSJHIUFOFE PG USJCCMFT. BP TPVUI BOE SFQMB
UP UIF
350 DATAEJNJUIJVN US2TUBMT.  BP OPSUI UIFO FBTU UP BVYJMJBS2 UPO
USPM.
360 DATATQPDL XJMM IFMQ 2PV XJUI UIF LMJOHPO UPNNBOEFS ... UIFO
JOTFSU
370 DATAUIF TIVDU (JG 2PV EPO'U IBWF JU JU JT JO UIF XBSPIPVTP).

380 DATA2PV POMZ IBWF B MJNJUFE BNPVOU PG UJNF TP 1VSSZ CBDL UP
UIF
390 DATACSJEBP BOE QSFTT UIF CVUUPO UP GJSF UIF FOHJOFT.  XIFO T
UBCMF
400 DATAPSCJU JT BUIJFWFE ... ZPV IBWF TVDUFTTGVMMZ UPNQMFUFE 2P
VS
410 DATAT U B S   U S P L   B E W F O U V S F !
420 DATA***
```

to Star Trek Adventure in scrambled form. Type in the program and run it to get detailed directions. This program is a last resort for extremely confused adventurers or a final check for you successful ones.

Special Note for Model III Owners: For the adventure program to operate as described on a Model III TRS-80, the following changes must be made. First, replace lines 29 and 30 as shown below:

```
29 J=PEEK(VARPTR(ML$)+1)+256*PEEK(VARPTR
(ML$)+2):J=J+65535*(J 32 767):FORK=JTOJ+13:
READX:POKEK,X:NEXTK:DELETE29:DATA121,254,
128,48,6,254,64,56,2,61,13,195,115,4

30 91=PEEK(16414):S2=PEEK(16415):POKE16414,PEEK
(VARPTR(ML$)+1):POKE16415,PEEK(VARPTR(ML$)+2):
FX=PEEK(16414)+256*PEEK(16415)+10:IFPEEK
(16396)=201THENPOKE16396,23ELSEPOKE23886,0
```

Finally, replace the phrase POKEFX,61 found in lines 1000, 3010 and 3500 with the phrase POKEFX,13.

In the adventure solution program, delete line 20 in the listing and copy line 29 as shown above.■

THE ALTERNATE SOURCE

Spellbound

Shoot-em-ups not your style? Consider Spellbound, a sophisticated word game that will both "please" and "astound"; "please" because you will always have a capable partner at the the flip of a switch and "astound" because you can demonstrate the superior capabilities of your TRS-80. Spellbound conducts a word search using its 12,000 word on-line dictionary in less than a minute. Words are extracted from a matrix of random letters by both you and your TRS-80. One to six humans can play; the word matrix is designed using a unique graphic configuration. The ideal demonstration program for your pedantic friends. Spellbound is written in a combination of Z80 and Fortran; original purchasers can also purchase the source code for an additional $10. Sorry, this program only comes on disk. Both Model I and III versions are included for $19.95. Because of critical real-time task processing, this program will not work with Newdos/80.

TASORT
The Alternate SORT

TASORT is a high speed sorting program, designed for easy use in BASIC programs that need powerful sort capabilities. TASORT is fast, sorts up to 8S arrays simultaneously, sorts any combinations of variable types, is completely relocatable, respects high-memory, and will sort ascending, descending and tag-along. TASORT works with all Model I and III configurations, tape and disk, and is the perfect bridge for making your programs 100% compatible with all environments. TASORT is $19.95, tape or disk. Write for information on licensing TASORT for your commercial applications.

Modem 80

Need a top quality terminal program that works under a variety of enviroments? Modem 80 and its support packages have the TRS-80 talking with dozens of systems, both micros and mainframes. A special protocol permits easy and reliable communication with CP/M systems, too! Modem 80 allows you access to DOS commands while online, route screen displays to your printer, change all local communication parameters at any time, upload and download, send files larger than memory (if the other system recognizes XON and XOFF protocol), and even includes a HOST program so that you may access your unattended TRS-80 from a remote site. Four separate translation tables are included for communication output, video, printer and disk files. These are user modifiable. The Modem 80 package of seven programs and user's manual is $39.95. This program is one of our best buys!

Information Storage And Retrieval

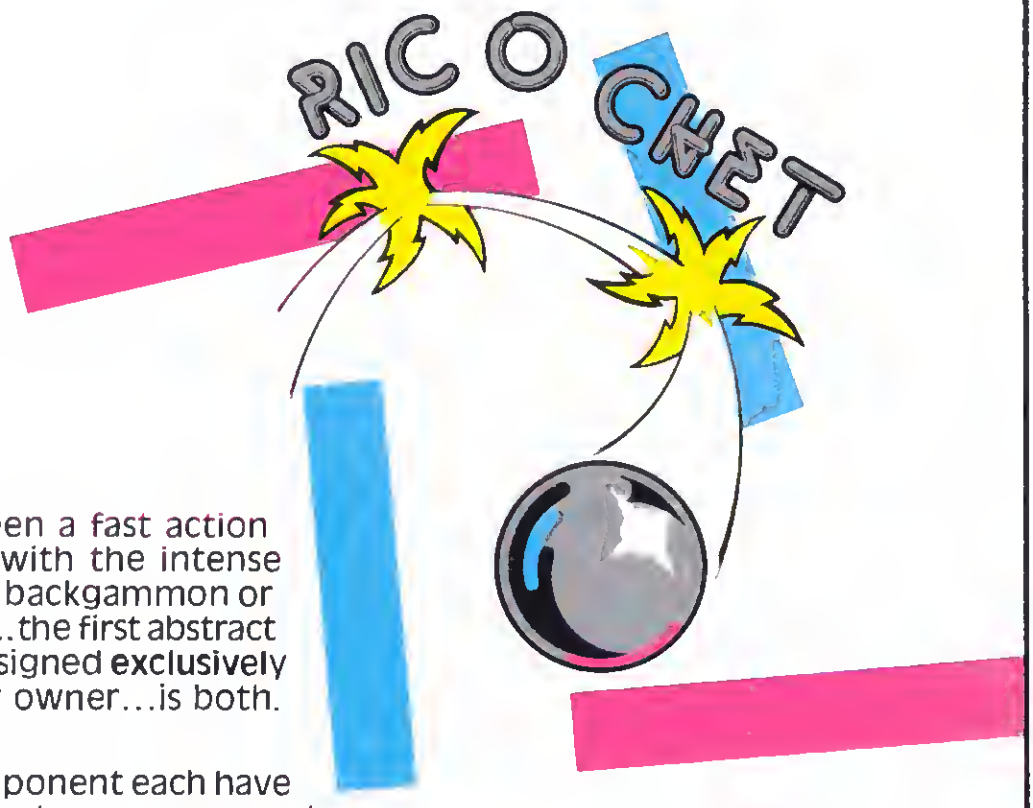
ISAR I, Version 2.0, is the ideal beginning data base manager. ISAR allows you to create data files to your specifications and add, change and scan records as desired. Version 2.0 features include: Sorting of all ten fields at once; reports are generated by a small BASIC program generated by your response to prompts (this allows your printer to work at the fastest possible speed and reports only need be defined ONCE); reports support titles, page numbers, column headings, footers, literals, end of file totals, special control characters LPRINTed before the report and more; documentation has been expanded to cover items such as error trapping, utilization of disk space, sample user sessions and information about how ISAR stores the information necessary to access a file (making conversions between ISAR and other data base managers easier). ISAR I, Version 2.0, complete with all enhancements and documentation, $39.95. (Unregistered ISAR Expanded Users: Upgrades available!)

The Alternate Source Programmer's Journal

A software toolbox for your TRS-80 Model I and III. Each issue of TAS features utilities and applications that enhance your investment in the revolution. And more. We tackle comparison reviews, Model I/III compatibility, useful patches for popular programs, modifying BASIC, using Z80 assembler and many other languages. The Alternate Source is $24 for 12 issues. If you haven't seen our journal, request a sample copy with any product on this page.

Thanks for reading our ad! TAS is located at 704 North Pennsylvania, Lansing, MI 48906. Phones: (517) 482-8270 and (800) 248-0284 (order-line). Check, Money Order, Visa, MC, COD ($1.75 extra), and written P.O.s welcome. We also stock several hundred programs from other vendors. Ask for a copy of the latest TAS flyer. Dealer inquiries welcome. ~89

It's Here! The Computer Strategy Game with Bounce!



For:
Apple
Atari
TRS-80

Have you ever seen a fast action game combined with the intense strategy of chess, backgammon or Othello? Ricochet...the first abstract strategy game designed **exclusively** for the computer owner...is both. And loads of fun!

You and your opponent each have six opposing blocks to maneuver and two launchers to fire. Your shots ricochet off the blocks, changing their position with every hit, while earning you points on the way to their targets. The longer your shot ricochets, the more points you get.

You don't have to play alone, either. Play against any of four different computer opponents, (each a different personality), or another human. Five game variants to choose from—each requires a different strategy.

Ricochet is truly competitive...if you want it to be. A "smart clock" lets you put more pressure on your opponent by forcing him to play faster than you. But you've got to win two out of three (or three out of five) games to claim victory.

Your computer rates you after each match, so you can compare your mastery of the game with that of other players. In the long run, you're trying to rack up points for your personal Ricochet Rating.

Get Ricochet now at your local dealer for your Atari, Apple or TRS-80. Suggested retail price: $19.95.

Another Mind Toy From EPYX

COMPUTER GAMES THINKERS PLAY

mind toys

*APPLE, ATARI and TRS-80 are trademarks of Apple Computer, Inc., Atari, Inc. and Tandy Corp., respectively

© 1981, AUTOMATED SIMULATIONS, INC.
P.O. Box 4247, Mountain View, CA 94040.

-28

Just thinking out loud.

The Master Muses

Charlie Heath
2 Swetts Court
Watertown, MA 02172

Computer Othello/Reversi has come of age. Othello is one of the first strategic computerized board games to offer a significant challenge to the very best human players.

Othello is the trademarked name for a board game marketed by Gabriel Industries. It was adapted from the game of Reversi, which was popular in England in the late 1800s.

The Rules

Othello/Reversi is a two-player game played on an eight by eight grid similar to a chess board. The squares are all the same color. There are four symmetric dots distinguishing the board's different sections.

Othello playing pieces are white on one side and black on the other. Each player owns one of the colors. The players alternate turns by playing one disk onto the board. If a player has no legal moves, he passes his turn to his opponent; but if he does have a legal move, he must make it no matter how bad it might be for him.

The game ends when the board is filled with disks, or when neither player can move. The winner is the player with the most disks on the board.

Legal Moves

The player places a disk, with his color face-up, onto an empty square. The piece he puts down must *bracket* one or more of the opponent's pieces. The bracketed pieces are then flipped over to become the player's own color.

To bracket an opponent's piece, there must be a straight line of one or more of the opponent's pieces between the empty square the player is moving to, and another one of the player's pieces on the board prior to his move. Bracketing can occur in any of eight directions radially outward from the square being moved to.

Why Computer Programs Play So Well

There are three reasons why computers play Othello/Reversi as well as they do. The end of the game is any easily bounded event. The game is over when all 64 squares are occupied. The game tree becomes very narrow as the end of the game approaches. The program can always make the move that guarantees it the best result, assuming perfect play by the opponent.

The endgame search begins when there are 15 empty squares on the board—one-quarter of the entire game! Humans, on the other hand, must rely on heuristic methods of choosing the best move until there are only a few squares left. Even in expert tournament competition serious miscalculations are often made with as few as four or five empty squares left.

In Othello/Reversi it is difficult for a human to foresee all tactical consequences of a move under consideration. Any given move changes the board's composition making it difficult for e human to judge a move's consequences.

Computers are ideally suited to tactical search methods. An average Othello/Reversi position has about 10 possible legal moves. Using Alpha-Beta pruning reduces the average branching factor to about four moves per branch. This allows the program to avoid short-term traps.

Othello/Reversi is a young game, as far as master level play goes. The strategy considered to be best involves maximizing your mobility while minimizing your opponent's.

The two most important aspects to Othello/Reversi playing strategy are easily accomplished by a computer program. These are: number of moves available to a player, and quantity of perimeter disks. The more legal moves a player has, the more likely it is that he will have at least one reasonable move to make. The second aspect, perimeter disks, indicates current and future mobility: All legal moves must flip at least one perimeter disk. Using these two items as primary evaluation criteria allows for a very "intelligent" computer opponent.

Your Micro: Opponent and Friend

Othello/Reversi programmers direct more effort into designing versions that will assist and improve the player's skills while giving a good game, rather than just producing a program that will simply beat your pants off.

Some programs have features allowing you to review a past game, try out different lines of play, ask the computer to suggest a move, and even get the computer to predict the game's final outcome once it has completed its endgame search.

There is no doubt that some Othello/Reversi progrems are better than others, but, even so, most will make you work for your victories. ■

Charlie Heath is the author of one of the best Reversi programs available. It is distributed by Instant Software.

Circle 73 on Reader Service card →

ACCOUNTING...

the Language of Business spoken here!

PLUS
Computer Technology, Inc.

SOFTWARE FOR FINANCIAL MANAGEMENT

We make it easy! Plus Accounting Software Packages are menu-driven for easy and confident operation. Our extensive documentation for installation and operation is easy to understand. And, Plus is easy to buy, we are amazingly inexpensive. The Plus technical support package with our 800 number "hot-line" makes it easy to stay up-to-date and informed.

Select a package for a specific application, or get the total system. You can be sure your professionally-designed Plus Accounting Software Package will provide efficient, cost-effective financial management for your most demanding needs. Make a sound business decision today...make your financial control and planning management a Plus. We speak your language.

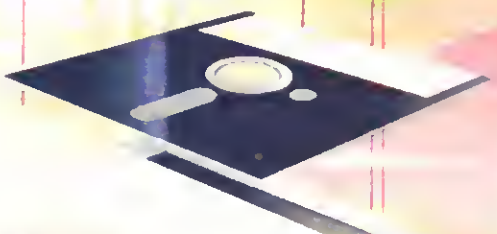
PLUS FINANCIAL AND ACCOUNTING SOFTWARE PACKAGES AVAILABLE:

- **GENERAL LEDGER • ACCOUNTS RECEIVABLE**
- **ACCOUNTS PAYABLE • FIXED ASSETS**
- **PAYROLL • EASYTRAK™ ACTIVITY MONITORING SYSTEM**

All packages menu-driven. Each accounting package is available "stand alone", or can automatically post to General Ledger. Flexible user-defined file sizes for flexibility. Complete with extensive documentation and thorough installation guide. Furnished on disc.

PLUS PROGRAM AVAILABILITY:

- TANDY MODELS II & III
- THE IBM PERSONAL COMPUTER
- 8" CP/M 2.2 VERSION



PAYROLL
GENERAL LEDGER
ACCOUNTS PAYABLE
FIXED ASSETS
EASYTRAK™
ACCOUNTS RECEIVABLE

PLUS
Computer Technology, Inc.

PLUS COMPUTER TECHNOLOGY, INC.
6900 North Austin Avenue—Chicago, IL 60648
1-312-647-0988
1-800-323-4240 (Outside Illinois)

VISA

master charge

WHAT WE DO FOR YOU IS OUR MOST IMPORTANT PRODUCT.

Now get lost and confused in technicolor.

Color Maze

Richard A. White
44 Dow Court
Fairfield, OH 45015

Program Listing

```
2 GOTO960
3 '(C)1981 RICHARD A WHITE 44DOW CT FAIRFIELD, OH 513-829-5163
10 CLEAR1008:DIMSQ(15,11):GOTO900
18 PRINT" ***TO PROCEED TOUCH ANY KEY***";
19 RD=RND(10):Z$=INKEY$:IFZ$=""THEN 19ELSERETURN
20 PRINT"TO SET TAPE RECORDER AND        POSITION TAPE TO SAVE O
R LOAD,  PRESS ANY KEY FOR MOTORON ON ANDTHEN ANY KEY FOR MOTORO
FF"
21 Z1$=Z$:GOSUB19
22 AUDIOON:MOTORON:GOSUB19:MOTOROFF:Z$=Z1$:RETURN
32 INPUTZ$:IFZ$<>"" THEN MB=VAL(Z$):IFMB>0 THEN MA=MB-1
34 RD=RND(2)-1:RETURN
36 POKE65494,0:P=0:Z$=INKEY$:IFZ$<>""THENU=ASC(Z$)ELSEP=1:RETURN
37 H=2:V=2:IFU=8THENH=0ELSEIFU=9THENH=1ELSEIFU=10THENV=1ELSEIFU=
94THENV=0ELSEP=1
38 RETURN
41 POKE65495,0:Z=CW:DRAW"BM"+STR$(X)+","+STR$(Y)+";BM-8,+8":IFFN
LH(Z)=8 THEN DRAW"C2;M+0,-16"ELSEGOSUB48
42 IFFNTH(Z)=4 THEN DRAW"C2;M+16,-0"ELSEGOSUB50
43 IFFNRH(Z)=2 THEN DRAW"C2;M+0,+16"ELSEGOSUB52
44 IFFNBH(Z)=1 THEN DRAW"C2;M-16,-0"ELSEGOSUB54
45 DRAW"BM+8,-8":RETURN
47 POKE65495,0:DRAW"BM"+STR$(X)+","+STR$(Y)+";BM-8,+8":GOSUB48:G
OSUB50:GOSUB52:GOSUB54:DRAW"BM+8,-8":POKE65494,0:RETURN
48 IFFNLB(Z)=128 THEN DRAW"C3;M-0,-16"ELSEDRAW"C1;M-0,-16"
49 RETURN
50 IFFNTB(Z)=64 THEN DRAW"C3;M+16,-0"ELSEDRAW"C1;M+16,-0"
51 RETURN
52 IFFNRB(Z)=32 THEN DRAW"C3;M-0,+16"ELSEDRAW"C1;M-0,+16"
53 RETURN
54 IFFNBB(Z)=16 THEN DRAW"C3;M-16,-0"ELSEDRAW"C1;M-16,-0"
55 RETURN
78 '
90 CLS:PRINT:PRINT"PRESS <F> IF TAPE FILE ELSE ANY KEY":GOSUB19:
IFZ$="F" THEN FT$="I":GOTO805
100 POKE65495,0:CLS:NA=15:ND=11:X1=20:X=X1:Y1=14:Y=Y1
110 PMODE1,3:COLOR3,1:PCLS1:PMODE1,1:COLOR3,1:PCLS1:SCREEN1,0
120 Y=Y1-16:FORD=1TOND:Y=Y+16:X=X1-16:FORA=1TONA:X=X+16:OP=0:BL=
0:HO=0:HB=0:CW=0:IFRND(3)=3 THEN BL=1:OP=-1
121 IFRND(3)=3THEN1FRND(2)=2THENHB=1ELSEHO=1
122 IFA>1TREN140
125 GOSUB34:IFRD=1THENCW=128:BL=1:GOSUB34:IFRD=0THEN150ELSEHB=1:
GOTO135
130 CW=0:OP=1:GOSUB34:IFRD=0THEN150ELSEHO=1
135 CW=CW+0:GOTO150
140 Z=SQ(A-1,D):IFFNRB(Z)=32THEN145ELSEOP=OP+1:IFFNRH(Z)<>2THEN1
50ELSEHO=1:CW=CW+8:GOTO150
145 BL=BL+1:CW=CW+128:IFFNRH(Z)<>2THEN150ELSEHB=1:CW=CW+8
```

Program continues

At some time or another, everyone has tried to find their way through a maze. Good mazes are quite complex and are not suited for display on a microcomputer screen. Simple ones are solved at a glance and are no fun.

A solution to the computer maze problem is to hide part or most of it. My Color Maze program (see the listing) makes a simple maze based on squares and then randomly hides two sides of each square.

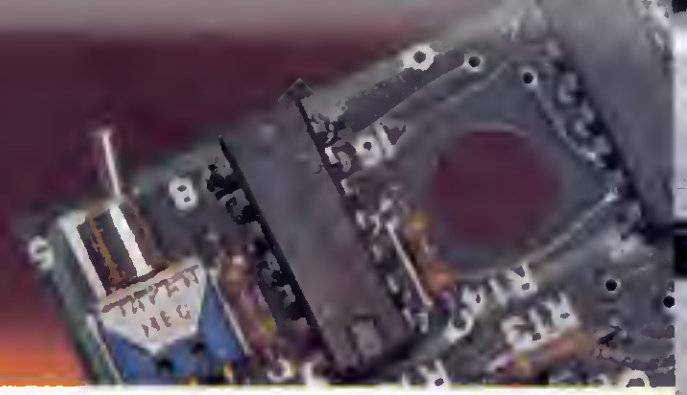
The TRS-80 Color Computer with Extended Color Basic does the job. The 192 by 128-pixel,

The Key Box

16K RAM
Color Computer
Extended Color Basic

Circle 31 on Reader Service card.

THE SWITCH



SWITCH TO 5"/8" DOUBLE DENSITY

LNDoubler 5/8

FEATURES

- 5- and 8-inch* disk drives
- Single- & double-density
- Any size and density in any mix
- Read Model I, II* and III disks
- 5- or 8-inch* system disk
- Single & double sided disk drives
- DOS+ 3.3.9 included, with Disk BASIC.
- 6 month warranty
- Up to 3.75 megabytes online
- Easy installation – plug-in & run
- Analog phase lock loop data separation
- Precision write precompensation
- Regulated power supply
- Guaranteed operation at 4MHz
- All contacts gold plated
- Solder masked & silk screened
- Runs under DOS+ 3.3.9, TRSDOS 2.3, NEWDOS 2.1, NEWDOS/80 1.0, LDOS, NEWDOS/80 2.0, and ULTRADOS
- Reads 40- and 35-track disks on 80-track drives
- FD1791 controller + your FD1771
- Fits Model I expansion interfaces
- Fits LNW expansion interfaces
- Track configurations to 80-tracks
- 5 inch disk storage increased to:
  161,280 bytes – 35-track SS/DD
  322,560 bytes – 35-track DS/DD
  184,320 bytes – 40-track SS/DD
  368,640 bytes – 40-track DS/DD
  368,640 bytes – 80-track SS/DD
  737,280 bytes – 80-track DS/DD
- 8 inch disk storage increased to:
  591,360 bytes – 77-track SS/DD
  1,182,720 bytes – 77-track DS/DD

SS: single-sided DS: double-sided
SD: single-density DD: double-density

COMPLETE – The *LNDoubler 5/8*, switches your Model I or LNW-80 into the most versatile computer you can own. The LNDoubler's switch allows you to boot from 5- or 8-inch system disks, and it's accessible from outside the interface. The *LNDoubler 5/8* comes with a double-density disk operating system (DOS+ 3.3.9), complete with BASIC and utility programs . . . ready to run your software NOW!

VERSATILE – Whether you want single-sided, double-sided, single- or double-density, 5- or 8-inch operation, complete versatility is here today! Any combination of 5- and 8-inch disk storage is possible with the *LNDoubler 5/8*. Each of your present 40-track, single-sided 5-inch drives will store up to 184,320 bytes (formatted storage) – that's an 80% increase in storage capacity for only half the cost of just one disk drive. With three 8-inch double-density, double-sided drives your Model I will have 3.75 Megabytes of online storage – that's more storage than a Model II or Model III!

ADVANCED – The *LNDoubler 5/8* is the most technically advanced, tested and reliable double-density board you can buy. The *LNDoubler 5/8* has more features, more options and more software support than any other product of its kind.

EASY TO INSTALL – The *LNDoubler 5/8* is easy to install. There are no traces to cut, no wiring to do, just a screwdriver and a few minutes of your time is all that is required. The instructions are fully illustrated for all interfaces. In minutes you will be 'up-and-running', and enjoying your computer as never before.

COMPARE – Compare features, compare quality, compare value, and make the **SWITCH** today!

Immediate delivery from stock – at your dealer NOW for only

$219.95

DEALERS – You too can make The Switch.

LNW RESEARCH CORPORATION

2620 WALNUT Tustin, CA. 92680 (714) 544-5744 (714) 641-8850

*5" drive operation requires special cable, 8" double-density requires 3.58MHz CPU speed-up modification or LNW-80 4MHz computer. TRS-80 is a trademark of Tandy Corporation.

four-color graphics mode with the Draw command generates all graphics. Data for each square is packed into an integer and leter recovered using the logical AND function. (Dennis Kitaz discussed the method in *80 Micro*, October 1981, page 53.) Data can be packed using an OR, or by adding the decimal number representing the bit to be set to the working number. in this program e single value smaller than 255 carries eil the data needed to draw each square.

The maze is a random 15 by 11-square array with generally two sides of each square blocked. Occasionally only one side is blocked to assure there will be a way through most mazes. Two sides of each square are hidden (yellow). Blockad exposed sides are blue.

The computer selects a random starting point at the left side, where a flashing point appears. Your objective Is to reach the right side by using the arrow keys. As you move you leave e red trail. When you try to go through a blocked side, your trail stops at the side and the flashing point returns to the center of the square. Once in the maze, you will occasionally have to backtrack to get out of a box.

When you solve the maze, the right side flashes. Press one of the arrow keys tc display the number of moves and the time to complete the maze. A menu also appears. You can play the same maze again, make a new one or display the hidden lines of the one just played. Here the maze is drawn and flashed alternately with the hidden maze. You can stop either display by pressing Shift @.

You cen seve the tough mazes to cassette for your friends. When you first enter the output file mode, rewind the tape. The program times a run pest the leader on the first save end spaces eech dump about two seconds apart. The program automatically numbers each save, but you can change the number if you want. The file Input mode works much the same way. Onca you use either the input or the output mode, the program remains in that mode until

Program continued

```
150 IFD>1THEN170ELSEGOSUB34:IFRD=1THEN160ELSEOP=OP+1:IFHO=1THEN1
62ELSEIFOP=2THEN155ELSEGOSUB34:IFRD=0THEN162
155 HO=1:CW=CW+64:GOTO225
160 CW=CW+64:BL=BL+1:IFHB=1THEN225ELSEIFBL=2THEN165ELSEGOSUB34:I
FRD=1THEN165ELSE225
162 CW=CW+64:GOTO225
165 HB=1:GOTO225
170 Z=SQ(A,D-1):IFFNBB(Z)=16THEN175ELSEOP=OP+1:IFFNBH(Z)<>1THEN1
80ELSEHO=1:CW=CW+4:GOTO180
175 BL=BL+1:CW=CW+64:IFFNBH(Z)<>1THEN180ELSEHB=1:CW=CW+4
180 IFA=NA THEN225
185 Z=SQ(A+1,D-1):IFFNBB(Z)=16THEN190ELSENT=0:GOTO205
190 NT=1:IFOP=2THEN210
195 OP=OP+1:IFHO=1THEN250ELSEIFOP=2THEN200ELSEGOSUB34:IFRD=0THEN
250
200 CW=CW+2:HO=1:GOTO250
205 IFBL<2THEN210ELSE:OP=OP+1:IFHO=1THEN250ELSEIFFNBH(Z)=1THEN25
0ELSE200
210 GOSUB34:IFRD=0THEN195ELSEBL=BL+1:CW=CW+32:IFNT=OTHENIFHB=1TH
EN250ELSEIFBL=2THEN220ELSEGOSUB34:IFRD=0THEN250
215 IFFNBH(Z)=-1THEN250
220 CW=CW+2:HB=1:GOTO250
225 IFBL<2THEN230ELSEOP=OP+1:GOSUB34:IFRD=0THEN250ELSEHO=1:CW=CW
+1:GOTO250
230 IFOP=2THEN240ELSEGOSUB34:IFRD=0THEN240ELSEOP=OP+1:IFHO=1THEN
250ELSEIFOP=2THEN235ELSEGOSUB34:IFRD=0THEN250
235 CW=CW+2:HO=1:GOTO250
240 BL=BL+1:CW=CW+32:IFHB=1THEN250ELSEIFBL=2THEN245ELSEGOSUB34:I
FRD=0THEN250
245 CW=CW+2:HB=1
250 IFD=ND THENCW=CW+16ELSEIFBL=2THEN255ELSECW=CW+16:IFHB=1THEN2
65ELSE260
255 IFHO=1THEN265ELSE260
260 IFD<>ND THENCW=CW+1
265 SQ(A,D)=CW: GOSUB41:NEXTA,D:POKE65494,0
275 GOTO400
400 'MAZE PLAY
410 A=0:Z=SQ(1,1):IFFNLB(Z)=128THENSQ(0,1)=128+64+32ELSESQ(0,1)=
128+64
420 FORD=2TO10:Z=SQ(1,D):IFFNLB(Z)=128THENSQ(0,D)=128+32ELSESQ(0
,D)=128
425 NEXT:Z=SQ(1,11):IFFNLB(Z)=128THENSQ(0,11)=128+32+16ELSESQ(0,
11)=128+16
430 A=0:MV=0:D=1+RND(9):X=4:Y=14+16*(D-1):PMODE1,1:SCREEN1,0:DRA
W"BM"+STR$(X)+","+STR$(Y)+"C4NU2NR2ND2":TIMER=0:Z=SQ(A,D)
435 FORZ=1TO10:NEXT:Z=SQ(A,D):GOSUB36:IFP=0THEN440ELSEIFC=1THENP
SET(X,Y,2):C=0:GOTO435
436 PSET(X,Y,4):C=1:GOTO435
440 IFH=0THEN450ELSEIFH=1THEN460
445 IFV=0THEN470ELSEIFV=1THEN480ELSE435
450 IFA=0THEN435ELSEDRAW"C4M-6,-0":IFFNLB(Z)=128THENDRAW"M+6,+0"
:MV=MV+1:GOTO435
455 DRAW"M-10,-0":X=X-16:A=A-1:MV=MV+1:GOTO435
460 DRAW"C4M+6,-0":IFFNRB(Z)=32THENDRAW"M-6,-0":MV=MV+1:GOTO435
465 IFA+1>15THEN490ELSEDRAW"M+10,-0":X=X+16:A=A+1:MV=MV+1:GOTO43
5
470 DRAW"C4M+0,-6":IFFNTB(Z)=64THENDRAW"M+0,+6":MV=MV+1:GOTO435
475 DRAW"M+0,-10":Y=Y-16:D=D-1:MV=MV+1:GOTO435
480 DRAW"C4M+0,+6":IFFNBB(Z)=16THENDRAW"M+0,-6":MV=MV+1:GOTO435
485 DRAW"M+0,+10":Y=Y+16:D=D+1:MV=MV+1:GOTO435
490 TI=TIMER/60:MV=MV+1:DRAW"R4C2M254,102"
495 DRAW"C3U176":FORZ=1TO50:NEXT:DRAW"C2D176":FORZ=1TO50:NEXT:DR
AW"C4U176":FORZ=1TO30:NEXT:DRAW"BD176"
500 GOSUB36:IFP=0THEN505ELSE495
505 SCREEN0,1:CLS:PRINT:PRINT"  "MV" MOVES",,"  "INT(TI/60)" MIN
UTES ";:PRINTUSING"##.##";TI-60*INT(TI/60);:PRINT" SECONDS"
510 PRINT:PRINT"PRESS KEY IN <> TO;",,,"  <F> SAVE MAZE OR GET N
EW FILE","  <P> PLAY AGAIN ","  <N> MAKE NEW MAZE","  <D> DISPLA
Y HIDDEN LINES","  <E> END"
515 FORZ=1TO50:GOSUB19:IFZ$="F"THEN800ELSEIFZ$="P"THEN535ELSEIFZ
$="N"THEN100ELSEIFZ$="D"THEN524ELSEIFZ$<>"E"THEN515
520 STOP
524 PMODE1,3:SCREEN1,0:PCLS:X=4:FORA=1TO15:X=X+16:Y=14-16:FORD=1
```

Program continues

WITH TaxPlan™

Your best clients count on you for their best tax alternatives.

Month in and month out, not just during tax season, our TAXPLAN software package for the TRS-80* makes those time-consuming, repetitive computations a snap. It's the most comprehensive and sophisticated tax estimator ever offered.

FIVE YEAR TAX PLANNING

You can enter or change one or more figures in seconds, literally. And your tax strategy for a full five years can include:

- Rate schedule tax
- Income averaging
- Alternative tax
- Minimum/maximum tax
- Alternative minimum tax
- Self-employment tax

If you are an accountant, tax preparer, attorney, investor, loan specialist, or just a businessman who wants to see his tax options, your answer is TAXPLAN. From the company that has developed the only tax preparation software that really works: **Contract Services Associates.**

TAXPLAN is ready to run on your TRS-80 Models I, II, or III, for a modest $249.95. (Only $149.95 to registered users of our full tax system.)

Don't wait. Contact us today for the outstanding TAXPLAN software package.

Contract Services Associates
706 South Euclid, Anaheim, CA 92802,
Telephone: (714) 635-4055

*TRS-80 is a trademark of Tandy Corp

CSA CONTRACT SERVICES ASSOCIATES

Improving The Bottom Line.

Program continued

```
TO11:Y=Y+16:Z=SQ(A,D):GOSUB47:NEXT:NEXT
525 IFT=3THENT=1ELSET=3
530 GOSUB36:IFP=0THEN505ELSEPMODE1,T:SCREEN1,0:FORX=1TO200:NEXT:
GOTO525
535 PMODE1,3:SCREEN1,0:PCLS:PMODE1,1:SCREEN1,0:PCLS:X=4:FORA=1TO
15:X=X+16:Y=14-16:FORD=1TO11:Y=Y+16:CW=SQ(A,O):GOSUB41:NEXT:NEXT
:GOTO400
000 IFMA>0THEN005ELSECLS:PRINT"PRESS <KEY> TO ENTER FILE TYPE",,
,"  <O> OUTPUT MAZES TO TAPE",,,"  <I> INPUT MAZES FROM TAPE":GO
SUB19:FT$=Z$
001 CLS:PRINT:PRINT"PLACE CASETTE IN RECOROER.",,,"PRESS<Y> TO P
OSITION TAPE.",,,"RECORDER WILL RUN PAST LEADER  BEFORE RECORDI
NG.":GOSUB10:IFZ$="Y"THENGOSUB20
002 IFZ$="I"THENPRINT"SET RECORDER TO PLAY & PRESS ANYKEY":GOSUB
19:GOTO030
003 IFZ$="O" THEN PRINT"SET RECORDER TO RECORD & PRESS  ANY KEY"
:GOSUB19
005 Z$="":IFFT$="I"THEN031ELSEIFFT$<>"O"THEN800
010 CLS:PRINT:PRINT"COMPUTER WILL NUMBER SAVED MAZE AUTOMATICALL
Y AS MAZE "MA+1,SF$:GOSUB32
015 PRINT:INPUT"SET RECORDER TO RECORD AND PRESS <ENTER>.";Z$:MO
TORON:AUDIOON:IFMA=0THENFORZ=1TO6000ELSEFORZ=1TO1000
020 NEXT:MA=MA+1:NF$="MAZEL"+STR$(MA):OPEN"O",-1,NF$:FORA=1TO15:
FORD=1TO11:PRINT#-1,SQ(A,D):NEXT:NEXT:CLOSE-1:GOTO510
030 CLS:PRINT:PRINT"PLACE CASETTE IN RECORDER.",,,"THIS PROGRAM
ACCEPTS FILES      NAMED 'MAZEL XX'":PRINT:PRINT"PRESS <Y> TO PO
SITION TAPE":PRINT:GOSUB10
031 IFZ$="Y"THENGOSUB20ELSEPRINT:PRINT"COMPUTER WILL INPUT MAZE
","NUMBER "MA+1,,SF$:GOSUB32
035 PRINT:INPUT"SET RECORDER TO PLAY AND PRESS  <ENTER>";Z$
040 MA=MA+1:NF$="MAZEL"+STR$(MA):OPEN"I",-1,NF$:FORA=1TO15:FORD=
1TO11:INPUT#-1,SQ(A,O):NEXT:NEXT:CLOSE-1:GOTO535
900 DEF FNLH(Z)=(Z)AND(8):DEF FNTB(Z)=(Z)AND(4):DEF FNRH(Z)=(Z)A
ND(2):DEF FNBH(Z)=(Z)AND(1)
910 DEF FNLB(Z)=(Z)AND(128):DEF FNTB(Z)=(Z)AND(64):DEF FNRB(Z)=(
Z)AND(32):DEF FNBB(Z)=(Z)AND(16)
920 SF$="UNLESS A DIFFERENT NUMBER IS    ENTERED NOW."
930 CLS:PRINT"   THE PROGRAM WILL MAKE A MAZE AND SELECT A START
 POINT ON THE LEFT FOR YOU. GENERALLY, EACH  SQUARE IN THE MAZE
 WILL HAVE    TWO SIDES OPEN AND TWO SIDES","BLOCKED."
940 PRINT"THIS IS A BLOCKED SIDE- "STRING$(5,175),"THIS IS A HID
DEN SIDE-  "STRING$(5,159),"IT MAY OR MAY NOT BE BLOCKED.  ALL
SIDES NOT SHOWN ARE OPEN.","USE THE ARROW KEYS TO MOVE","THROUGH
 THE MAZE AND TO GO TO"
950 PRINT"THE SCORE AND MENU DISPLAY WHEN YOU HAVE SOLVED IT":GO
SUB18:GOTO90
960 PCLEAR4:GOTO3
```

you end and run it again.

If you braak tha program and want to restart without losing tha current maza or tha tape fila number, anter GOTO 505. This raturns you to tha menu.

Any Changes?

How about joysticks and sound? I thought of but did not includa, many almilar idaas.

Tha 15 by 11-maza graphics and program uses over 15.5K RAM. Mora squaras or code for multipla playar scorakaeping would need mora then 16K of mamory.

Tha caasatta fila routinas ara in linas 800-840. Hara tha kay variabla is MV. If you ramova this from lina 800 and changa it to MI in tha input routina and to MO in the output routine, you will be abla to choose input or output and keep track of tha fila number of aach. But you will continually be swapping cassattas—a bettar aolution may be disks.

I hava triad joysticks and sound. Sound slows tha program and changas tha action whan moving through tha maze. You can substituta a joystick subroutina for tha INKEY$ subroutina in linas 36 and 37. I lika tha arrow kays bettar, but don't let that stop you! ■

Richard White has an MS in metallurgical engineering and is employed by Proctor & Gamble.

OMNITERM

What is OMNITERM?

OMNITERM is a professional communications package for the TRS-80 that allows you to easily communicate and transfer files or programs with almost any other computer. We've never found a computer that **OMNITERM** can't work with. It's a complete package because it includes not only the terminal program itself, but also **conversion utilities**, a **text editor**, special **configuration files**, **serious** documentation and **serious** support.

Why do I need it?

You need **OMNITERM** if you need to communicate efficiently with many different computers, or if you want to customize your TRS-80 for use with one particular computer. You need **OMNITERM** to **SOLVE** your communications problems once and for all.

What do I get?

The **OMNITERM** package includes the **OMNITERM** terminal program, four conversion utilities, a text editor, and setting files for use with popular computers such as CompuServe, the Source, and Dow Jones — just as samples of what you can do for the computer you want to work with. The package includes six programs, seven data files, and real documentation: a 76-page manual that has been called "**the best in the industry.**" And **OMNITERM** comes with real user support. We can be reached via CompuServe, Source, phone, or mail to promptly answer your questions about using OMNITERM.

What do I need to use OMNITERM?

A Model I or Model III TRS-80, at least 32K of memory, one disk, and the RS-232 interface or Microconnection modem. **OMNITERM** works with all ROMs and DOSes, and will work with your special keyboard drivers.

What will it do?

OMNITERM allows you to translate any character going to any device: printer, screen, disk, keyboard, or communications line, giving you complete control and allowing you to redefine the character sets of all devices. It will let you transfer data, and run your printer while connected for a record of everything that happens. **OMNITERM** can reformat your screen so that 80, 32, or 40 column lines are easy to read and look neat on your TRS-80 screen. It even lets you get on remote computers with just one keystroke! The program lets you send special characters, echo characters, count UART errors, configure your UART, send True Breaks and use lower case. It accepts VIDEOTEX codes, giving you **full cursor control**. It will even let you review text that has scrolled off the screen! Best of all, **OMNITERM** will save a special file with all your changes so you can quickly use **OMNITERM** for any one of many different computers by loading the proper file. It's easy to use since it's menu driven, and gives you a full status display so you can examine and change everything.

"**OMNITERM** has my vote as the top TRS-80 terminal program available today" Kilobaud Microcomputing, June 1981, pages 16-19.

OMNITERM is $95 (plus shipping if COD) Call for 24 hour shipment. Manual alone $15, applied toward complete package. Visa, M/C, and COD accepted. MA residents add 5% tax. Dealer inquiries invited.

Contact Lindbergh Systems for your custom programming needs. We are expert at writing software to work with YOUR hardware, in assembler, high-level language, or Forth.

Lindbergh Systems

41 Fairhill Road, Holden, MA 01520 (617) 852-0233 Source: TCA818 CompuServe: 70310,267 TRS-80 is a ™ of Tandy Corp

✓ 135

The Original Magazine for Owners of the TRS-80™ MicroComputer

MODEL I • MODEL II • MODEL III • POCKET COMPUTER • COLOR COMPUTER

H & E COMPUTRONICS INC.

MONTHLY NEWS MAGAZINE

- PRACTICAL APPLICATIONS
- NEW EXPANDED BUSINESS SECTIONS
- GAMBLING
- GAMES
- EDUCATION
- PERSONAL FINANCE
- BEGINNER'S CORNER
- NEW PRODUCTS
- SOFTWARE EXCHANGE
- MARKET PLACE
- QUESTIONS & ANSWERS
- PROGRAM PRINT OUTS

...and MORE!

YOUR CHOICE FREE

with your Subscription or Renewal

A.

NANOS SYSTEMS CORP

TRS-80 At Your Fingertips Complete quick reference guide to basic, assembly language and graphic codes —all at your fingertips for all TRS-80 computers (specify computer).

Assembly Language Section N/A for Color Computer

OR

B.

A Word Processor, Data Management System and Cleanup (A maze game) All on cassette. (Add $3 for diskette, add $5 for modified MOD-II diskette version —N/A on color computer or pocket computer.)

READER SERVICE FOR H & E COMPUTRONICS 9

H & E COMPUTRONICS INC.

50 North Pascack Road
Spring Valley New York 10977

CALL TOLL FREE
800-431-2818
(Outside of New York State)

24 HOUR ORDER LINE
914-425-1535

master charge VISA AMERICAN EXPRESS

☐ One Year Magazine Subscription $24 ☐ New ☐ Renewal
☐ Two Year Magazine Subscription $48.00 ☐ New ☐ Renewal
☐ Sample Issue $4 ☐ Mod II Newsletter Subscription $18

Your Choice TRS-80™ at Your Fingertips or Word Processor/ Data Management
Model I Model II Model III Color Computer Pocket Computer

NEW! NEW! MOD-II NEWSLETTER "$18/year (or 12 issues)"

Name Address City

State Zip Signature

Credit Card Number Expiration Date

Add $12/Year (Canada, Mexico)—Add $24/Year Air Mail outside of U.S.A., Canada, and Mexico
All Prices and Specifications Subject to Change

* TRS-80 is a trademark of the Radio Shack Division of Tandy Corp

Tired Of Your GENERAL LEDGER?

VERSA-LEDGER II

★ THE ULTIMATE PERSONAL CHECK REGISTER

★ A PROFESSIONAL ACCOUNTING SYSTEM

★ A PERSONAL FINANCIAL MANAGER

★ A SMALL BUSINESS ACCOUNTING SYSTEM

★ A COMPLETE GENERAL LEDGER

FOR YOUR TRS-80* MODEL I, II, III or 16 • APPLE II* • I.B.M.* • XEROX* • ATARI* OSBORNE* • ALL MICROSOFT BASIC COMPUTERS

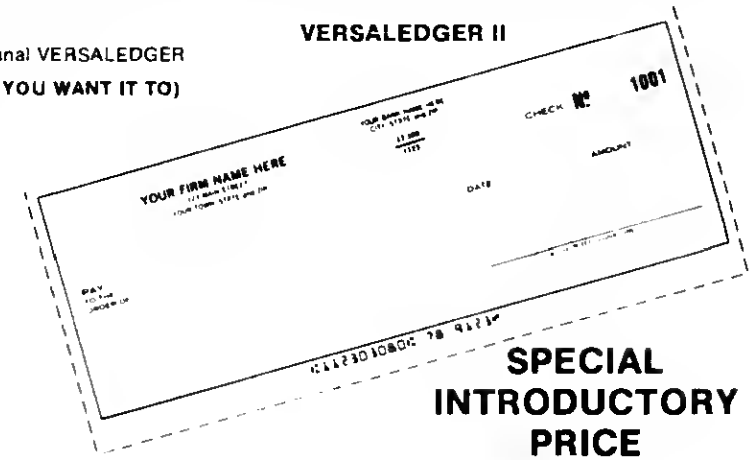
*TRS-80 is a trademark of Tandy Corp - *APPLE is a trademark of Apple Corp - *I.B.M. is a trademark of I.B.M. Corp - *XEROX is a trademark of Xerox Corp
*ATARI is a trademark of Atari Inc - *OSBORNE is a trademark of Osborne Corp

HOW IT WORKS . . . .

VERSALEDGER II is a complete accounting system that grows as you or your business grows. To start, your VERSA-LEDGER II acts as a simple method of keeping track of your checkbook. Just enter your check number, date and whom the check is made out to. As you or your business grows, you may add more details to your transactions . . . . . account number, detailed account explanations, etc.

- VERSALEDGER II is an expanded and enhanced version of our original VERSALEDGER
- VERSALEDGER II gives you an instant cash balance at anytime. **(IF YOU WANT IT TO)**
- VERSALEDGER II can be used as a small personal checkbook register. **(IF YOU WANT IT TO)**
- VERSALEDGER II can run your million dollar corporation. **(IF YOU WANT IT TO)**
- VERSALEDGER II prints checks. **(IF YOU WANT IT TO)**
- VERSALEDGER II stores all check information forever. **(IF YOU WANT IT TO)**
- VERSALEDGER II can distribute one check to multiple expense accounts. **(IF YOU WANT IT TO)**
- VERSALEDGER II can handle more than one checkbook. **(IF YOU WANT IT TO)**
- VERSALEDGER II can be used to replace a general ledger. **(IF YOU WANT IT TO)**
- VERSALEDGER II prints balance sheets and income statements. **(IF YOU WANT IT TO)**
- VERSALEDGER II can interact with any of the other four modules of the VERSABUSINESS SYSTEM.

VERSALEDGER II



SPECIAL INTRODUCTORY PRICE

$99.95

($199.95 after Dec. 31, 1982)

- VERSALEDGER II comes with a professionally written manual (created for the first-time computer user), which includes sample report printouts.
- VERSALEDGER II HAS AN ALMOST UNLIMITED CAPACITY . . . .
  - (300 checks per month on single density 5¼" disk drives such as the TRS-80 Model I)
  - (500 checks per month on the Apple II)
  - (2400 checks per month on the TRS-80 Model III)
  - (6000 checks per month on the TRS-80 Model II)
  - (3000 checks per month on single density 8" CP/M)
  - (almost unlimited capacity on hard disk drive)
- VERSALEDGER II OUTPERFORMS ALL OTHER COMPETITIVE SYSTEMS NOW AVAILABLE TO MICROCOMPUTER USERS, AT A FRACTION OF THE COST (AND WE OFFER A 30-DAY MONEY BACK GUARANTEE TO BACK UP OUR CLAIM!)

— CAN BE USED WITH 1 or MORE DISK DRIVES with 48K —

ALSO AVAILABLE: VERSARECEIVABLES, VERSAPAYABLES, VERSAPAYROLL, and VERSAINVENTORY

COMPUTRONICS

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977

★ ADD $3.00 FOR SHIPPING IN UPS AREAS
★ ADD $4.00 FOR C.O.D. OR NON-UPS AREAS
★ ADD $5.00 TO CANADA AND MEXICO
★ ADD PROPER POSTAGE OUTSIDE U.S., CANADA & MEXICO

MASTER CHARGE VISA AMERICAN EXPRESS

24 HOUR ORDER LINE
(914) 425-1535

NEW TOLL-FREE ORDER LINE
(OUTSIDE OF N.Y. STATE)
(800) 431-2818

ALL PRICES & SPECIFICATIONS SUBJECT TO CHANGE
DELIVERY SUBJECT TO AVAILABILITY

✓9

PAYROLL SIMPLIFIED

VERSA-- PAYROLL

★ THE ULTIMATE PROFESSIONAL PAYROLL SYSTEM

★ HANDLES ALL PAYROLL FUNCTIONS AND REPORTS

★ QUICK QUARTERLY AND END OF YEAR SUMMARIES

★ PERFECT FOR A SMALL BUSINESS

★ EXPANDS TO HANDLE LARGE CORPORATE PAYROLLS

FOR YOUR TRS-80* MODEL I, II, III, 16 • APPLE * • I.B.M.* • XEROX* • ATARI*
ALL MICROSOFT BASIC COMPUTERS

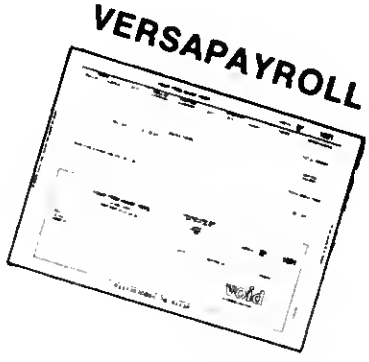
* TRS-80 is a trademark of Tandy Corp. - * APPLE is a trademark of Apple Corp. - *I.B.M. is a trademark of I.B.M. Corp. - *XEROX is a trademark of Xerox Corp. - *ATARI is a trademark of Atari Inc.

HOW IT WORKS . . . .

VERSAPAYROLL is a complete menu driven payroll system that grows as you or your business grows. Your VERSA-PAYROLL acts as a simple payroll system keeping track of all government required payroll information. Just enter the employees, VERSAPAYROLL will perform all the necessary payroll calculations automatically and display to totals on your screen. The user has complete control to accept the totals, to print or not print out a check and to post or not post the total to our **VERSALEDGER** system.

- VERSAPAYROLL automatically prints out your PAYROLL checks. **(IF YOU WANT IT TO)**
- VERSAPAYROLL allows you to override any payroll deduction. **(IF YOU WANT IT TO)**
- VERSAPAYROLL automatically posts all checks written to our VERSALEDGER system. **(IF YOU WANT IT TO)**
- VERSAPAYROLL allows the user to print out PAYROLL checks one at a time. **(IF YOU WANT IT TO)**
- VERSAPAYROLL allows the user to print out all your PAYROLL checks at the same time. **(IF YOU WANT IT TO)**
- VERSAPAYROLL gives you a summary of any employee's year to date payroll totals or all employee totals at any time. **(IF YOU WANT IT TO)**
- VERSAPAYROLL will allow you to correct any error made at any time and automatically refigure all totals. **(IF YOU WANT IT TO)**
- VERSAPAYROLL works in every state. **(IF YOU WANT IT TO)**
- VERSAPAYROLL automatically calculates all federal and states taxes. **(IF YOU WANT IT TO)**
- VERSAPAYROLL allows for all of the standard deductions plus state, city and three miscellaneous deductions. **(IF YOU WANT IT TO)**
- VERSAPAYROLL prints all government required reports. **(IF YOU WANT IT TO)**
- VERSAPAYROLL permanently stores all PAYROLL transactions. **(IF YOU WANT IT TO)**
- VERSAPAYROLL HAS AN ALMOST UNLIMITED CAPACITY . . . .

  Can handle up to 300 employees on a TRS-80 MODEL I, 600 employees on a TRS-80 MODEL III, 1200 employees on a TRS-80 MODEL II, 500 employees on an APPLE II, 600 employees on any single density 8" CP/M computer and almost unlimited capacity on hard disk systems



INTRODUCTORY PRICE
$99.95

CAN BE USED WITH 1 or MORE DISK DRIVES (AND 48K)

VERSAPAYROLL HAS BEEN CREATED WITH THE FIRST TIME COMPUTER USER IN MIND

COMPUTRONICS
MATHEMATICAL APPLICATIONS SERVICE

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977

ADD $3.00 FOR SHIPPING IN UPS AREAS
ADD $4.00 FOR C.O.D. OR NON-UPS AREAS
ADD $5.00 TO CANADA AND MEXICO
ADD PROPER POSTAGE OUTSIDE OF U.S., CANADA AND MEXICO

NEW TOLL-FREE
ORDER LINE
(OUTSIDE OF N.Y. STATE)
(800) 431-2818

VISA

24 HOUR ORDER LINE
(914) 425-1535

*** ALL PRICES AND SPECIFICATIONS SUBJECT TO CHANGE***

See List of Advertisers on page 338

NEW NEW

from HOWE SOFTWARE

FOR THE TRS-80 MODEL I AND MODEL III

System Diagnostic

NEW

Tests Every Component Of Your TRS-80 and Verifies Proper Operations

For Cassette or Disk

IS YOUR COMPUTER WORKING?

ARE YOU SURE?

DISK $99.95

CASSETTE $94.95

ROM:	checksum test
RAM:	four separate tests including every address and data value.
VIDEO DISPLAY:	character generator, video RAM, and video signal.
KEYBOARD:	every key contact tested.
LINE PRINTER:	character test.
CASSETTE RECORDER:	read/write/verify data.
RS-232-C INTEREACE:	connector fault, data transmission, framing, data loop, baud rate generator.
DISK DRIVES:	disk controller, drive select and restore, track seek and verify data, read/write/verify all tracks and sectors with or without erasing, sector formatting, disk drive timer, disk head cleaner.

— Individual tests of each device with operator monitoring and intervention.
— Continuous sysem tests run continually for hours testing each component, with diagnostic reports optionally written on line printer.
— One program adapts to any system configuration and hardware.
— Complete instructions and documentation.

SMART TERMINAL

Enables your TRS-80 to be used as a data communications terminal to a time-sharing system, computer bulletin board, or another computer, via the RS-232-C interface.

- MEMORY BUFFER holds data for transmission or data received from other computer.
- CASSETTE or DISK may be used to load or save data from memory.
- AUTOMATIC TRANSMISSION of data from memory.
- AUTOMATIC STORAGE of incoming data at user's option.
- TRANSMIT or RECEIVE WITH VERIFICATION options included for communication between two TRS-80s using Smart Terminal.
- Full CONTROL KEYS, including control key mapping into any ASCII character. True BREAK key. Lower case supported on Model I.
- Buffered LINE PRINTER ECHO for incoming data.
- Disk and cassette files fully compatible with ELECTRIC PENCIL™ and SCRIPSIT™ programs.
- BAUD RATE and RS-232-C CHARACTERISTICS can be reset from within the program.
- SAVE PROGRAM option creates "personalized" back-up copy of program with all options set as specified by user.
- ONE PROGRAM supports both cassette and disk systems. Program is compatible with PMC-80 and other TRS-80 "work alike" computers.

Model I or III Version — supplied on cassette $69.75; supplied on diskette $74.95

Model II (CP/M) Version $79.95

MON-3 and MON-4

The TRS-80 Monitor Programs #3 and #4 are powerful utility programs enabling you to interact directly with the TRS-80 in Machine Language. They are as useful for beginners as for advanced programmers.

- BEGINNERS can learn to interact directly with the computer in Machine Language.
- 40-PAGE MANUAL provided with each program.
- SIMPLE commands, easy to use.

The Features Of The Monitor Programs Enable You To The Eollowing.....

- DISPLAY memory in different ways.
- DISASSEMBLE memory to see Machine Language commands.
- MOVE and COMPARE memory areas.
- SEARCH through memory to find specific values.
- MODIFY memory in various ways.
- RELOCATE object programs.
- PRINT output on video display or line printer.
- READ and WRITE object tapes in SYSTEM Format.
- UNLOAD programs using low RAM on disk.
- SAVE and READ disk files (MON-4 Only).
- INPUT and OUTPUT of disk sectors (MON-4 Only).
- SEND and RECEIVE data over RS-232-C Interface (MON-4 Only).
- Create SYMBOLIC Tapes (MON-3) or Eiles (MON-4) of Disassembled output for Editor/Assembler program.

MON-3 (For Cassette Systems) $39.95

MON-4 (For Disk Systems) $49.95

MAILING LIST

Maintains mailing lists of over 1000 names. Commands allow adding, changing, deleting, and finding names. Sorting is done by machine language according to the information in any field (i.e., name, address, zip code). Labels printed in 1, 2, or 3 columns, in master list on one line, or on video display.

Disk Version Only $69.95

HOME BUDGET

Combines the maintenance of your checkbook with analysis of your income, expenses, and monthly bills. Handles data including bills, including bills, income, deposits, checks and debits to your checking account, and cash expenses. Computes checkbook balance, list of unpaid bills, monthly and year-to-date summaries of income and expenses showing income tax deductions. All output printed on video display or line printer at user's option. Complete instructions for customizing to suit your own budget.

Cassette $29.95

Disk $49.95

SMALL BUSINESS ACCOUNTING

Based on Dome Bookkeeping Record #612, this program keeps track of income, expenditures, and payroll for a small business of up to 16 employees. Income and expenditures can be entered on a daily, weekly, or monthly basis, and the program computes monthly, through last month, and year-to-date summaries. Payroll section keeps record of individual employees and their paychecks with up to six categories of payroll deductior Employee payroll record and year-to-date payroll totals can be computed. Manual contains complete instructions for customizing to suit your business.

Disk Version $49.95

Cassette Version $29.95

(Cassette Version does not contain payroll)

COMPUTRONICS

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977

VISA AMERICAN EXPRESS master charge

NEW TOLL-FREE ORDER LINE
(OUTSIDE OF N.Y. STATE)
(800) 431-2818

24 HOUR ORDER LINE
(914) 425-1535

- All orders processed within 24 Hours
- 30-Day money back guarantee
- Add $3.00 for shipping in UPS Areas
- Add $4.00 for C.O.D. or NON-UPS Areas
- Add $5.00 to Canada or Mexico
- Add exact postage to all other countries

H & E COMPUTRONICS INC.

• • EVERYTHING FOR YOUR TRS-80™ • ATARI™ • APPLE™ • PET™ • CP/M™ • XEROX™ • IBM™ • •

* TRS-80 is a trademark of the Radio Shack Division of Tandy Corp. - * ATARI is a trademark of Atari Inc. - * APPLE is a trademark of Apple Corp. - * PET is a trademark of Commodore
* CP/M is a trademark of Digital Research - *XEROX is a trademark of Xerox Corp. - * IBM is a trademark of IBM Corp.

BUSINESS PAC 100

★ All orders processed within 24-Hours
★ 30-Day money back guarantee

100 Ready-To-Run Business Programs

(ON CASSETTE OR DISKETTE).....Includes 128 Page Users Manual.....
Inventory Control.....Payroll.....Bookkeeping System.....Stock Calculations.....
Checkbook Maintenance.....Accounts Receivable.....Accounts Payable.....

BUSINESS 100 PROGRAM LIST

	NAME	DESCRIPTION
1	RULE78	Interest Apportionment by Rule of the 78's
2	ANNU1	Annuity computation program
3	DATE	Time between dates
4	DAYYEAR	Day of year a particular date falls on
5	LEASEINT	Interest rate on lease
6	BREAKEVN	Breakeven analysis
7	DEPRSL	Straightline depreciation
8	DEPRSY	Sum of the digits depreciation
9	DEPRDB	Declining balance depreciation
10	DEPRDDB	Double declining balance depreciation
11	TAXDEP	Cash flow vs. depreciation tables
12	CHECK2	Prints NEBS checks along with daily register
13	CHECKBK1	Checkbook maintenance program
14	MORTGAGE/A	Mortgage amortization table
15	MULTMON	Computes time needed for money to double, triple, etc.
16	SALVAGE	Determines salvage value of an investment
17	RRVARIN	Rate of return on investment with variable inflows
18	RRCONST	Rate of return on investment with constant inflows
19	EFFECT	Effective interest rate of a loan
20	FVAL	Future value of an investment (compound interest)
21	PVAL	Present value of a future amount
22	LOANPAY	Amount of payment on a loan
23	REGWITH	Equal withdrawals from investment to leave 0 over
24	SIMPDISK	Simple discount analysis
25	DATEVAL	Equivalent & nonequivalent dated values for oblig.
26	ANNUDEF	Present value of deferred annuities
27	MARKUP	% Markup analysis for items
28	SINKFUND	Sinking fund amortization program
29	BONDVAL	Value of a bond
30	DEPLETE	Depletion analysis
31	BLACKSH	Black Scholes options analysis
32	STOCVAL1	Expected return on stock via discounts dividends
33	WARVAL	Value of a warrant
34	BONDVAL2	Value of a bond
35	EPSEST	Estimate of future earnings per share for company
36	BETAALPH	Computes alpha and beta variables for stock
37	SHARPE1	Portfolio selection model-i.e. what stocks to hold
38	OPTWRITE	Option writing computations
39	RTVAL	Value of a right
40	EXPVAL	Expected value analysis
41	BAYES	Bayesian decisions
42	VALPRINF	Value of perfect information
43	VALADINF	Value of additional information
44	UTILITY	Derives utility function
45	SIMPLEX	Linear programming solution by simplex method
46	TRANS	Transportation method for linear programming
47	EOQ	Economic order quantity inventory model
48	QUEUE1	Single server queueing (waiting line) model
49	CVP	Cost-volume-profit analysis
50	CONDPROF	Conditional profit tables
51	OPTLOSS	Opportunity loss tables
52	FQUOQ	Fixed quantity economic order quantity model
53	FQEOWSH	As above but with shortages permitted
54	FQEOQPB	As above but with quantity price breaks
55	QUEUECB	Cost-benefit waiting line analysis
56	NCFANAL	Net cash-flow analysis for simple investment
57	PROFIND	Profitability index of a project
58	CAP1	Cap. Asset Pr. Model analysis of project
59	WACC	Weighted average cost of capital
60	COMPBAL	True rate on loan with compensating bal. required
61	DISCBAL	True rate on discounted loan
62	MERGANAL	Merger analysis computations
63	FINRAT	Financial ratios for a firm
64	NPV	Net present value of project
65	PRINDLAS	Laspeyres price index
66	PRINDPA	Paasche price index
67	SEASIND	Constructs seasonal quantity indices for company
68	TIMETR	Time series analysis linear trend
69	TIMEMOV	Time series analysis moving average trend
70	FUPRINF	Future price estimation with inflation
71	MAILPAC	Mailing list system
72	LETWRT	Letter writing system-links with MAILPAC
73	SORT3	Sorts list of names
74	LABEL1	Shipping label maker
75	LABEL2	Name label maker
76	BUSBUD	DOME business bookkeeping system
77	TIMECLCK	Computes weeks total hours from timeclock info.
78	ACCTPAY	In memory accounts payable system-storage permitted
79	INVOICE	Generate invoice on screen and print on printer
80	INVENT2	In memory inventory control system
81	TELDIR	Computerized telephone directory
82	TIMUSAN	Time use analysis
83	ASSIGN	Use of assignment algorithm for optimal job assign.
84	ACCTREC	In memory accounts receivable system-storage ok
85	TERMSPAY	Compares 3 methods of repayment of loans
86	PAYNET	Computes gross pay required for given net
87	SELLPR	Computes selling price for given after tax amount
88	ARBCOMP	Arbitrage computations
89	DEPRSF	Sinking fund depreciation
90	UPSZONE	Finds UPS zones from zip code
91	ENVELOPE	Types envelope including return address
92	AUTOEXP	Automobile expense analysis
93	INSFILE	Insurance policy file
94	PAYROLL2	In memory payroll system
95	DILANAL	Dilution analysis
96	LOANAFFD	Loan amount a borrower can afford
97	RENTPRCH	Purchase price for rental property
98	SALELEAS	Sale-leaseback analysis
99	RRCONVBD	Investor's rate of return on convertable bond
100	PORTVAL9	Stock market portfolio storage-valuation program

☐ **Cassette Version (TRS-80 Only)** **$99.95**
☐ **5-1/4" Diskette Version** **$99.95**
☐ **TRS-80* Model II & CPM Versions** **$149.95**

ADD $3.00 FOR SHIPPING IN UPS AREAS
ADD $4.00 FOR C.O.D. OR NON-UPS AREAS
ADD $5.00 TO CANADA AND MEXICO
ADD PROPER POSTAGE OUTSIDE OF U.S., CANADA AND MEXICO

NEW TOLL-FREE ORDER LINE
(OUTSIDE OF N.Y. STATE)
(800) 431-2818

AMERICAN EXPRESS VISA

24 HOUR ORDER LINE
(914) 425-1535

H & E COMPUTRONICS INC.
MATHEMATICAL APPLICATIONS SERVICE™

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977

master charge

ASK FOR OUR 64-PAGE CATALOG

***** ALL PRICES AND SPECIFICATIONS SUBJECT TO CHANGE*****

Experience Shows - S.B.S.G. has over 11,000 Installed Systems!

If you're not running Small Business Systems Group software . . . chances are you're not running!

GENERAL ACCOUNTING SYSTEM For TRS-80™

S.B.S.G. has created the first completely user-configurable accounting system available for the TRS-80™.

User configurable? Each S.B.S.G. General Accounting System Module (except Order Entry) can be operated independently, or any of the modules can be combined in any configuration, providing a complete, coordinated system to fit the needs of your business.

The S.B.S.G. System allows you the maximum efficient use of available disk space. Each module will run on a standard 1 disk drive system (except for Model I systems, which require 2 drives). As you add more disk drives to your system, the amount of on-line data storage increases. Now here's an important fact..... the S.B.S.G. General Accounting System "spans" your disk drives - that means that you can instantly access your data on any of **up to 8 disk drives** at any time! Since your S.B.S.G. Accounting System is user-configurable, it will work with 1, 2, 3, 4 or more disk drive systems - and it is fully compatible with most hard disk drive systems (at additional cost).

General Ledger

The General Ledger accounting system consolidates financial data from other accounting subsystems in an accurate and timely manner. Major reports include Trial Balance, Income Statement, Balance Sheet, a user-defined report, and more. All data is maintained and reported by month, quarter, year and previous three quarters. Transactions may be entered via direct posting and external posting generated by A/R, A/P, Payroll - or any other user source.

Accounts Receivable

The objective of a computerized A/R system is to prepare accurate and timely monthly statements to credit customers. Management can generate information required to control the amount of credit extended and the collection of money owed in order to maximize profitable credit sales while minimizing losses from bad debts. This system is invoice-oriented. Invoices can be entered before they're ready for billing, after billing, or even after they are paid. Accounts Receivable allows entry of new invoices, credit memos, debit memos, or modification or deletion invoice and allows for progress payment. The transaction information includes: type of A/R transaction, P.O. #, description of P.O., billing date, general ledger sales account #, invoice amount, shipping and transportation charges, tax charges, payment, and progress payment information. Reports include: summary or detail listing of invoices not yet billed, open items (unpaid invoices), closed items (paid invoices), and aging. Statements may be printed at any time and follow the format of nationally available forms.

Order Entry

The Order Entry Module was designed as a supplement to the Accounts Receivable Module, and will not operate independently. This system allows you to add, change, delete, list and print invoices; apply an invoice to correct customer account; generate computer assigned invoice numbers; note type (invoice credit memo, debit memo); record customer order number, invoice date, shipping date, FOB location, method of shipping, salesman, and payment terms; print selected number of shipping labels; enter, display and correct 10 lines of data per invoice, noting the part number, description, price, quantity ordered, extension, taxable or not. It also allows the user to enter, display and correct invoice totals, noting the invoice subtotal, taxes, shipping and handling with disbursement up to 5 General Ledger accounts; print a transaction report; maintain a terms code file in the system; update Account Receivable and generate summary report totals. It automatically coordinates to the Inventory Module (if used) to determine description, price and out of stock status, and to immediately deplete inventory stock. Price fields are easily modified to include percent or dollar discount.

Payroll

Payroll involves many complex calculations and the production of reports and documents, many of which are required by government agencies. The Payroll system performs all necessary payroll tasks including file maintenance, pay data entry and verification, computation of pay and deduction amounts, and the printing of reports and checks. State and Federal Tax changes are easily implemented by the user via menu prompting. In its link to General Ledger, each employee's payroll information is distributed to as many as 12 different G/L accounts; system automatically posts to cash account.

Accounts Payable

The Accounts Payable system receives data concerning purchases from suppliers and produces checks in payment of outstanding invoices. Several reports are available to supply information needed for the analysis of payments, expenses, purchases and cash requirements. The Accounts Payable system is invoice-oriented. It handles new invoices, credit memos and even debit memos and allows modification and deletion of invoices. The flexible check calculation procedures allows checks to be calculated for a set of vendors, specific vendors or even specific invoices. The reports include open item listings and closed item listings (both detail and summary), debit and credit memo listings, aging, check register report (to give an audit trail of checks printed), and vendor listing and vendor activity. Update reports are useful for audit trails and checking for accuracy. Checks may be printed at any time and follow the format of nationally available forms.

Inventory

Status reports and minimum reorder reports help to reduce the potential hazard of overstocking which results in cash flow problems. Program selection allows the user to store data for inventory located at up to five separate sites (divisions), coding up to 9 sales people. Available reports include inventory master list, price listings, period and year-to-date sales, stock status, minimum reorder point and commission information.

Model I, 48K and 2 Disk Drives... $195.00 Per Module
Model III, 48K ..... $195.00 Per Module
Model II, 64K ..... $295.00 Per Module
Sample Report Printouts ..... $ 10.00

H & E COMPUTRONICS Gives You A 30-Day Money Back Guarantee On All Modules

Experience Shows - S.B.S.G. has over 11,000 Installed Systems!

COMMUNICATIONS SYSTEMS

Small Business Systems Group markets a complete line of software which interfaces the TRS-80™ with ANY computer that communicates in ASCII. This family of products offers both terminal and host capabilities to users with even the most minimal hardware configurations. There has been wide interest in these products from "comm buffs," the educational community, and **businesses and individuals who need to communicate on a regular basis.** Our systems are among the most versatile and comprehensive on the market today for TRS-80™ microcomputers.

SMALL BUSINESS SYSTEMS GROUP

ST80-III™ -- The Ultimate Communications System

The "state of the art" in communications processors, designed for complex commercial applications. Included in this package is a set of programs that allow your TRS-80™ to talk to a timesharing computer, transfer files to and from your central business computer, and customize your ST80-III to your specific application.

Features Include: Selectable RS232 Setting • Help Display • Echo Feedback • Job Log (LDOS Mod I, Mod III) • 2-User Translation Tables • Auto Logon • 10 Function Keys (Definable) • RUBOUT Key (Definable) • Warm Restart • Automatic I.D. • True Break • Direct Cursor Addressing • DOS Command Support • Transmit Line Feed • Printer Support • Video Display Modes: SCROLL, FORMAT, PAGE, REVERSE VIDEO (Mod II), CURSOR ON/OFF • Auto-answer • Autodial (certain modems) • Append to memory buffer • Big buffer for printer • Off hook / on hook • 10 predefined ASCII strings in translation tables. • Registered users include NASA, USN, UPS, Westinghouse, and many colleges, universities and major banks.

Minimum Requirements: One disk drive, RS232-C, 32K Model I or III, 64K Model II.

Model I or III **$150.00**
Model II **$250.00**

FORUM-80™ – Communications Network

With Bill Abney's hot new communications product, you and your TRS-80™ can become part of one of the fastest growing communications networks in the country; your computer becomes an on-line bulletin board system: users can leave messages, get messages, swap information; exchange VisiCalc™ reports, charts, graphs or other correspondence with other computers.

Features Include: Security System • Constantly displayed time-in-use figure • User Friendly • User Configurable or can be modified for custom application • Future updates and upgrades available to register owners • Multiple command strings • Non-technical user and operator manuals.

Minimum Requirements: TRS-80™ (3-drive Mod I, 2-drive Mod III), 48K, RS232-C, Auto-answer modem.

Model I or III **$350.00**

ST-80-PBB™ -- Personal Bulletin Board

A small yet powerful bulletin board for the individual to gather and leave electronic mail. Messages reside in data base in memory, eliminating the problem of scanning magnetic media.

Features Include: Password Security System • Four levels of Access--Guest, Member, Owner, Operator • User Log • Four message types • Smart reverse scan to view messages from most recent to oldest.

Minimum Requirements: TRS-80™ (Mod I or III), 16K, Level II, Auto-answer modem, ST80-X10 Host Program ($50), RS232-C.

Model I or III **$50.00**

ST-80-CC™ – Communications Center

More than a personal bulletin board, this is a complete communications system for low to moderate traffic. Like ST80-PBB™ it supports four levels of users and four levels of messages with text editing and reverse scan of messages.

Additional Features Include: Transmit same message to many individuals • Auto logon and multiple command scanning • Print messages on line printer, save messages in memory buffer, maintain database without user intervention.

Minimum Requirements: TRS-80™ (Mod I or III), Level II, 48K, one disk, Auto-answer modem, ST80-X10 Host Program ($50), RS232-C.

Model I or III **$100.00**

MouseNet™ -- Advanced Bulletin Board System

Designed to accommodate high volume traffic, to operate simply enough for novice users, yet is fast and powerful enough for experienced callers.

Features Include: Messages stored on disk in keyed file • Uses machine language subroutines for speed • Supports text editing commands • Help commands guide user • System bulletins display each time a user logs on • All messages are dated.

Minimum Requirements: TRS-80™ (Mod I or III), 48K, RS232-C, 3 Disks, Auto-answer modem, text editor (such as Scripsit).

Model I or III **$295.00**

DELUXE PERSONAL FINANCE For TRS-80™ Model II

This is a sophisticated and unique financial analysis package which can be readily customized to suit your personal financial situation. It will:

- Accept and apply transactions to user-formatted budget categories.
- Separate cash and check disbursements.
- Allows up to ten category disbursements per check.
- Credit income/deposits according to source.
- Search, correct or void checks.
- Maintain an accurate checking account balance.
- Cancel returned checks.
- Provide monthly summaries of income vs. expenses.
- Calculate profit/loss.
- Summarize data by categories.
- Provides up to ten savings account summaries.

Model II **$75.00**
Model I Version **$35.00**

ACCESSIBILITY

We are here to serve your after-purchase needs. You can read our Monthly Newsletter containing current information about SBSG's products. Our Newsletter is free to our customers and is available at a minimal cost to anyone interested in Microcomputers or call SBSG directly for Programming and Accounting Support. We have 8 incoming lines or call our COMM: Micronet Bulletin Board: ID # 70319236; FORUM-80™: (617) 692-3973; MouseNet™: (617) 692-8121; The Source: #TCC 413.

H & E COMPUTRONICS Gives A 30-Day Money Back Guarantee On All SBSG Products

DEALER INQUIRIES ONLY:

SMALL BUSINESS SYSTEMS GROUP
6 CARLISLE ROAD
WESTFORD, MASS. 01886-5762
(617) 692-3800

END USER ORDERS:

H&E COMPUTRONICS INC.
MATHEMATICAL APPLICATIONS SERVICE™
50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977

ALL PRICES & SPECIFICATIONS SUBJECT TO CHANGE
DELIVERY SUBJECT TO AVAILABILITY

NEW TOLL-FREE ORDER LINE
(OUTSIDE OF N.Y. STATE)
(800) 431-2818

ADD $3.00 FOR SHIPPING IN UPS AREAS
ADD $4.00 FOR C.O.D. OR NON-UPS AREAS
ADD $5.00 TO CANADA AND MEXICO
ADD PROPER POSTAGE OUTSIDE OF U.S. CANADA AND MEXICO

24 HOUR ORDER LINE
(914) 425-1535

See List of Advertisers on page 338

H & E COMPUTRONICS INC.

• • • EVERYTHING FOR YOUR TRS-80* • • •
MODEL I, MODEL II & MODEL III

* TRS-80™ is a trademark of Tandy Corp

FROM RACET COMPUTES LTD . . . . . .

- All orders processed within 24 Hours
- 30-Day money back guarantee
- Add $3.00 for shipping in UPS Areas
- Add $4.00 for C.O.D. or NON-UPS Areas
- Add $5.00 to Canada or Mexico
- Add exact postage to all other countries

*** ESSENTIAL UTILITY PROGRAMS FOR EVERY TRS-80 OWNER ***

Facts About Racet Computes Utility Programs

*** ALL PROGRAMS ARE WRITTEN IN MACHINE LANGUAGE
*** ABSOLUTELY NO KNOWLEDGE OF MACHINE LANGUAGE IS NECESSARY TO USE ANY OF THE UTILITY PROGRAMS
*** EACH UTILITY PROGRAM IS CALLED UP FROM **BASIC** USING THE SIMPLE BASIC COMMANDS PROVIDED
*** EACH UTILITY PROGRAM COMES WITH A **RACET COMPUTES** INSTRUCTION MANUAL
*** EACH INSTRUCTION MANUAL INCLUDES SEVERAL EXAMPLES OF UTILITY USAGE
*** EACH UTILITY ALLOWS THE USER TO PERFORM CERTAIN BASIC OPERATIONS TEN, TWENTY OR MORE TIMES FASTER THAN THE EQUIVALENT BASIC ROUTINE (FOR EXAMPLE, **GSF** CAN SORT AN ARRAY OF 1000 RANDOM NAMES INTO ALPHABETICAL ORDER IN UNDER 9 SECONDS!!)

GSF (GENERALIZED SUBROUTINE FACILITY)

- SORTS 1000-ELEMENT ARRAYS IN 9 SECONDS
- SORTS UP TO 15 ARRAYS SIMULTANEOUSLY (MIXED STRING, FLOATING POINT AND INTEGER)
- SORTS SINGLE OR MULTIPLE SUBSTRINGS AS ASCENDING OR DESCENDING SORT KEYS
- READ AND WRITE ARRAYS TO CASSETTE
- COMPRESS AND UNCOMPRESS DATA IN MEMORY
- MOVE ARRAYS IN MEMORY
- DUPLICATE MEMORY
- FAST HORIZONTAL AND VERTICAL LINES
- SCREEN CONTROLS FOR SCROLLING THE SCREEN UP, DOWN, LEFT, RIGHT AND FOR GENERATING INVERSE GRAPHIC DISPLAYS
- ADDS PEEKS AND POKES (MOD-II VERSION ONLY)

MODEL-I VERSION	$25.00
MODEL-II VERSION	$50.00
MODEL-III VERSION	$30.00

KFS-80 (KEYED FILE SYSTEM)

- CREATE ISAM FILES (INDEX SEQUENTIAL ACCESS METHOD)
- ALLOWS INSTANT ACCESS TO ANY RECORD ON YOUR DISKETTE
- INSTANTLY RETRIEVE RECORDS FROM MAILING LISTS, INVENTORY, ACCOUNTS RECEIVABLE, OR VIRTUALLY ANY APPLICATION WHERE RAPID ACCESS IS REQUIRED TO NAMED RECORDS
- PROVIDES THE BASIC PROGRAMMER THE ABILITY TO RAPIDLY INSERT OR ACCESS KEYED RECORDS IN ONE OR MORE DATA FILES
- RECORDS ARE MAINTAINED IN SORTED ORDER BY A SPECIFIED KEY
- RECORDS MAY BE INSERTED OR RETRIEVED BY SUPPLYING THE KEY
- RECORDS MAY BE RETRIEVED SEQUENTIALLY IN SORTED ORDER
- RAPID ACCESS TO ANY FILE REGARDLESS OF THE NUMBER OF RECORDS
- MULTIPLE INDEX FILES CAN BE EASILY CREATED WHICH ALLOWS ACCESS OF A SINGLE DATABASE BY MULTIPLE KEYS (FOR EXAMPLE, BY BOTH NAME AND ZIP-CODE)

MODEL-I VERSION	$100.00
MODEL-II VERSION	$175.00
MODEL-III VERSION	$100.00

DSM (DISK SORT MERGE)

- SORT AN 85K DISKETTE IN LESS THAN THREE MINUTES!
- SORTS LARGE MULTIPLE DISKETTE FILES ON A MINIMUM ONE DRIVE SYSTEM
- ALL RECORDS ARE PHYSICALLY REARRANGED-NO KEY FILES ARE REQUIRED
- SORTS RANDOM FILES CREATED BY **BASIC**, INCLUDING FILES CONTAINING SUB-RECORDS SPANNING SECTORS
- SORTS ON ONE OR MORE FIELDS IN ASCENDING OR DESCENDING ORDER
- FIELDS MAY BE STIRNGS, INTEGER, BINARY INTEGER OR FLOATING POINT
- THE SORTED OUTPUT FILE MAY OPTIONALLY HAVE FIELDS DELETED, REARRANGED OR PADDED
- SORT COMMANDS CAN BE SAVED FOR REUSE
- SINGLE SORT, MERGE, OR MIXED SORT/MERGE OPERATIONS MAY BE PERFORMED
- SORTED OUTPUT MAY BE WRITTEN TO A NEW FILE, OR REPLACE THE ORIGINAL INPUT FILE

MODEL-I VERSION	$75.00
MODEL-II VERSION	$150.00
MODEL-III VERSION	$90.00

MAILLIST (A MAILING LIST DATABASE SYSTEM)

- IDEALLY SUITED FOR ORGANIZATION MAILING LISTS, PERSONAL ADDRESSBOOK OR MAILING LISTS BASED ON DATES SUCH AS REMINDERS FOR BIRTHDATES OR DUES PAYABLE
- USED ISAM (INDEX SEQUENTIAL ACCESS METHOD) FOR RAPID ACCESS TIMES
- YOUR **MAILLIST** CAN ALWAYS BE SORTED AND MAINTAINED BY UP TO FOUR INDEX FILES (FOR EXAMPLE, NAME, ZIPCODE, DATE AND NUMBER)
- **MAILLIST** ALLOWS UP TO 30 ATTRIBUTES TO BE SPECIFIED (TO BE USED IN SELECTION OF SPECIFIED RECORDS WHEN GENERATING REPORTS OR MAILING LABELS
- **MAILLIST** SUPPORTS BOTH 5 OR 9-DIGIT ZIPCODES
- PRINTING MAY BE STARTED OR ENDED AT ANY POINT IN THE LIST. THE USER CAN SPECIFY FIELDS OR CODES TO BE PRINTED
- CAPACITY IS 600 NAMES FOR MODEL-I, 3500 NAMES FOR MODEL II, 38,000 NAMES FOR MODEL II WITH HARD DISK DRIVE, 1200 NAMES FOR MODEL III

MODEL-I VERSION	$75.00
MODEL-II VERSION	$150.00
MODEL-III VERSION	$75.00

THE COMPUTRONICS INC.

HSDS HARD DISK DRIVE SOFTWARE

- MAKES TRSDOS COMPATIBLE WITH MOST HARD DISK DRIVES
- ADDS MANY EXTRA FEATURES TO TRSDOS $400.00

MODEL II FASTBACK — FULL DISK BACKUP IN 55 SECONDS

IN BUSINESS TIME IS MONEY, AND ONE BACKUP IS WORTH A THOUSAND TEARS.

- WORKS ON SYSTEMS WITH 2 OR MORE DRIVES
- CAN REPLACE YOUR EXISTING TRSDOS 1.2 or 2.0 BACKUP UTILITY

MODEL II ONLY $75.00

COMPROC (COMMAND PROCESSOR)

- AUTO YOUR DISK TO PERFORM ANY SEQUENCE OF INSTRUCTIONS THAT YOU NORMALLY GIVE FROM THE KEYBOARD (FOR EXAMPLE: INSERT THE DISKETTE, PRESS THE RESET BUTTON, YOUR COMMAND FILE COULD AUTOMATICALLY SHOW YOU THE DIRECTORY, SHOW THE FREE SPACE ON THE DIKSETTE, LOAD A MACHINE LANGUAGE SUBROUTINE, LOAD BASIC, LOAD AND RUN A BASIC PROGRAM, AND SELECT A GIVEN ITEM ON YOUR MENU - ALL WITHOUT TOUCHING THE KEYBOARD!)

MODEL-I VERSION $20.00
MODEL-III VERSION $30.00
NOT AVAILABLE FOR MODEL-II

DISCAT (DISKETTE CATALOG SYSTEM)

- THIS COMPREHENSIVE DISKETTE CATALOGUING/INDEXING UTILITY ALLOWS THE USER TO KEEP TRACK OF THOUSANDS OF PROGRAMS IN A CATEGORIZED LIBRARY. FILE INCLUDES PROGRAM NAMES AND EXTENSIONS, PROGRAM LENGTH, DISKETTE NUMBERS AND FREE SPACE ON EACH DISKETTE. KEEP A COMPLETE CATALOG OF THE DIRECTORIES ON ALL YOUR DISKETTES IN ALPHABETICAL ORDER (SORTED ON EACH DISKETTE) OR COMPLETE ALPHABETICAL LIST OF PROGRAMS ON ALL YOUR DISKETTES!

MODEL-I VERSION $50.00
MODEL-III VERSION $50.00
MODEL-II VERSION (SEE MODEL-II UTILITY PACKAGE)

BLINK (BASIC LINK FACILITY)

- LINK FROM **BASIC** PROGRAM TO ANOTHER SAVING ALL VARIABLES
- THE CHAINED PROGRAM MAY EITHER REPLACE THE ORIGINAL PROGRAM OR CAN BE MERGED BY STATEMENT NUMBER

MODEL-I VERSION $25.00
MODEL-III VERSION $50.00
MODEL-II VERSION (SEE MODEL-II UTILITY PACKAGE) $30.00

INFINITE BASIC

- ADDS OVER 80 COMMANDS TO BASIC
- SORTING, STRING CENTERING, ROTATION, TRUNCATION, JUSTIFICATION, DATA COMPRESSION, STRING TRANSLATION, COPYING, SCREEN DISPLAY SCROLLING, MATRIX OPERATIONS, SIMULTANEOUS EQUATIONS (THROUGH MATRIX INVERSION), DYNAMIC ARRAY RESHAPING

MODEL-I VERSION $50.00
MODEL-III VERSION $60.00
NOT AVAILABLE ON MODEL-II

INFINITE BUSINESS

- ADD ON PACKAGE TO **INFINITE BASIC** (REQUIRES INFINITE BASIC)
- ADDS PACKED DECIMAL ARITHMETIC WITH 127 DIGIT ACCURACY (+ 0 -/)
- COMPLETE PRINTER PAGINATION CONTROLS, AUTO HEADERS, FOOTERS AND PAGE NUMBERS
- BINARY SEARCH OF SORTED AND UNSORTED ARRAYS (INSTANT SEARCH OF AN ELEMENT WITHIN AN ARRAY)
- HASH CODES

MODEL-I VERSION $30.00
MODEL-III VERSION $30.00
NOT AVAILABLE ON MODEL-II

REMODEL-PROLOAD

- THE ULTIMATE RENUMBERING PROGRAM. RENUMBERS ALL OR PART OF A PROGRAM (ALLOWS PARTIAL RENUMBERING IN MIDDLE OF PROGRAMS)
- PARTIAL OR COMPLETE MERGE OF TWO CASSETTE PROGRAMS

MODEL-I VERSION $35.00
MODEL-III VERSION $35.00
NOT AVAILABLE ON MODEL-II

COPSYS

- COPY AND VERIFY ALL MACHINE LANGUAGE (SYSTEM) TAPES WRITTEN IN STANDARD FORMAT. IF YOU BUY A MACHINE LANGUAGE PROGRAM, **COPSYS** ALLOWS YOU TO EASILY COPY THE PROGRAM ONTO ANOTHER CASSETTE AS A BACKUP

MODEL-I VERSION $15.00
MODEL-III VERSION $20.00
NOT AVAILABLE ON MODEL-II

MODEL-II UTILITY PACKAGE

- ESSENTIAL FOR EVERY MOD-II OWNER
- RECOVER AND REPAIR FILES AND DIRECTORIES (BY JUST ENTERING A SINGLE COMMAND)
- XCOPY - SIMILAR TO COPY BUT CAN COPY ANY NUMBER OF FILES AT ONE TIME, FASTER AND MORE ACCURATE THAN COPY SINCE RECORDS ARE COPIED IN GROUPS RATHER THAN ONE RECORDS AT A TIME. USING XCOPY YOU CAN COPY FILES THAT CAN NOT BE COPIED USING THE COPY COMMAND
- SZAP - PROVIDES THE CAPABILITY TO READ AND MODIFY ANY SECTOR ON A DISKETTE
- XHIT - CAN BE USED TO REPAIR A DISKETTE DIRECTORY
- DCS - DIRECTOR CATALOG SYSTEM IS A UTILITY FOR THE MANAGEMENT OF USER DISKETTES. SETS OF A MULTIPLE DISKETTE DIRECTORY FILE (WITH UP TO 1200 INDIVIDUAL FILE NAMES). ALLOWS SELECTIVELY LISTED OR PRINTED LISTS OF DIRECTORY FILES IN COMBINED SORTED ORDER (FOR EXAMPLE: LISTED ALPHABETICALLY BY DISKETTE - OR A COMPOSITE ALPHABETICAL LIST OF ALL YOUR DISKETTES!)
- DEBUG-II - ADDS SEVERAL FEATURES TO THE PRESENT TRSDOS DEBUG UTILITY (INCLUDING SINGLE INSTRUCTION CYCLE, AUTO (LOOP) BREAKPOINTS, SUBROUTINE CALLING, BREAK KEY DETECTION AND MANY OTHERS

MODEL-II ONLY $150.00

MODEL-II DEVELOPMENT SYSTEM

- THIS PACKAGE IS A MUST FOR ASSEMBLY LANGUAGE PROGRAMMERS
- INCLUDES THE **MICROSOFT EDITOR ASSEMBLER PLUS** WITH ENHANCEMENTS FOR THE MODEL-II
- A COMPLETE DISASSEMBLER
- SUPERZAP FOR READING AND MODIFY ANY SELECTOR ON A DISKETTE

MODEL-II ONLY $125.00

MOD-II BASIC CROSS REFERENCE UTILITY

- LIST OR PRINT A SORTED CROSS REFERENCE TO ALL NUMBERS OR VARIABLES WITHIN A PROGRAM
- LIST OR PRINT ALL LINE NUMBERS CONTAINING A SPECIFIED STRING OF CHARACTERS

MODEL-II ONLY $50.00

***** ALL PRICES AND SPECIFICATIONS SUBJECT TO CHANGE *****

END USERS CALL:

THE COMPUTRONICS INC.
50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977

VISA

NEW TOLL-FREE ORDER LINE
(OUTSIDE OF N.Y. STATE)
(800) 431-2818

24 HOUR ORDER LINE
(914) 425-1535

ADD $3.00 FOR SHIPPING IN UPS AREAS
ADD $4.00 FOR C.O.D. OR NON-UPS AREAS
ADD $5.00 TO CANADA AND MEXICO
ADD PROPER POSTAGE OUTSIDE OF U.S., CANADA AND MEXICO

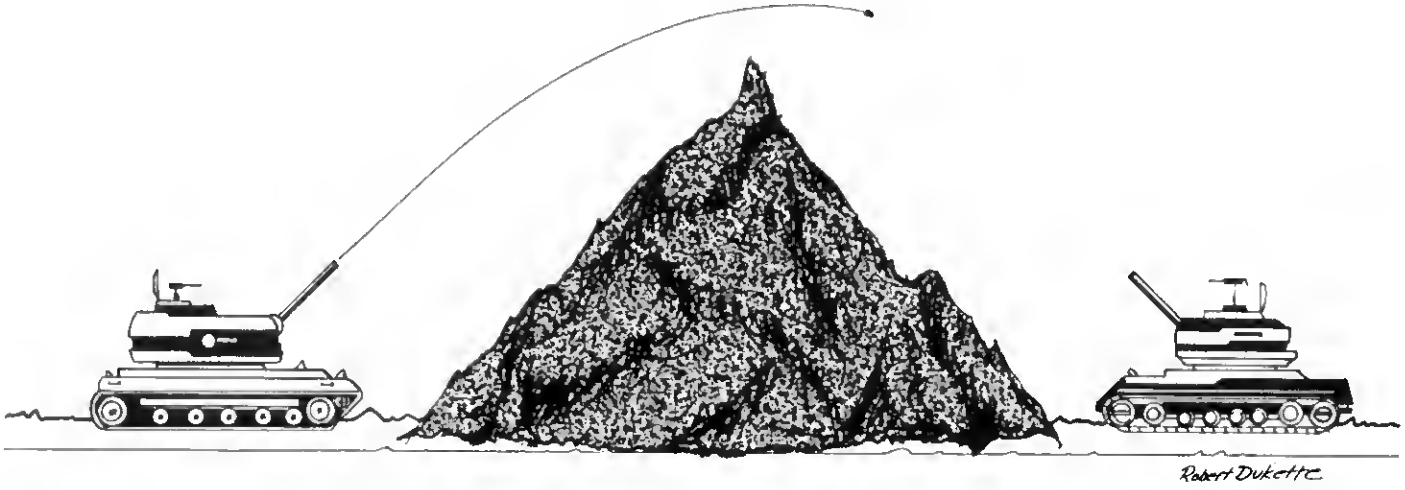
FOR DEALER INFORMATION CALL: RACET COMPUTES

1330 N. GLASSEL, SUITE M, ORANGE CA 92667
(714) 997-4950

See List of Advertisers on page 338

Games and a utility for your Color Computer.

Four in One Plus Another



Larry D. Becker
410A Fir Avenue
Niceville, FL 32578

Color Computer games do not have to cost $40 to be good, nor do you have to type your fingers to the bone entering reams of instruction code. These five programs are not only fun, they are short. Well, four are fun; the fifth is a utility.

The first two are adaptations of the games Breakout and Simon. My versions are called Brickout and Poindexter. Both are short enough to fit in 4K RAM. Mathtalk and Tank-Gun are written in Extended Color Basic. They are also short enough to keep typing them in from becoming a project. The utility, Pixprint, also a minor typing chore, is a screen dump for your Color Computer.

Brickout

This version is a translation of a Forth program created by Arnold Schaeffer. Since Forth is a fast language and Basic is slow, some sacrifices had to be made. In the original version the ball speed increased with each layer of bricks removed. Basic has to run at full speed just to keep things interesting so no speed changes are incorporated. Some improvement was achieved by changing the input from the keyboard to joysticks.

The screen is redrawn when all bricks are gone and the ball must break through to the bottom before play resumes.

C—Board color
BC—Ball color: same as board color
PS—Graphics string for paddle
PP—Paddle position (character position, not set position)
SC—Score
N—Loop variable: one ball played on each pass
NB—Number of balls: input
XD—X direction: one is ball moving right, minus one is ball moving left
BX—Horizontal coordinate of ball
YD—Y direction: one is ball moving down, minus one is ball moving up
BY—Vertical coordinate of ball
PD—Paddle displacement
T—Temporary storage
I,J—Loop variables

Table 1. Brickout Variable List

Poindexter

This game involves memorizing an increasing number of tones and colors to be reentered in the correct sequence. After entering and running the program, the screen blacks out until a bar of color appears as a tone sounds. Above the bar will be a number (one-four). Press this key to echo the bar and tone. If you did it correctly the machine will respond with the same first bar followed by a second. Echo these in the correct order.

The sequence will repeat adding a new note/bar until you make an incorrect entry. The speed increases as you progress. If you input the wrong key, the screen will clear and a message will tell you how many correct notes you entered. The maximum is 32 (Y in line 130). No one has reached it.

Mathtalk

Mathtalk is an elementary exercise in artificial intelligence programming. It relies on pattern matching techniques to extract the operation and uses the ASCII sequence to determine which characters are numbers.

Operations like plus, minus and times are stored in data statements and read sequentially. Each one is checked for a match against the input string by using the INSTR(A$,B$) function which returns the character position of B$ in A$, or zero if B$ is not contained in A$. A counter is incremented for use in an On...GOSUB statement each time a new class of operations is tried. Once an operation is identified, the program scans

The Key Box

Color Basic and Extended Basic
Color Computer
4K and 16K RAM
Line Printer VII
Joysticks

Scanned by Ira Goldklang - www.trs-80.com

left until it finds a number and stores it in N1. The program then looks to the right of the operation and stores that number in N2, The operation class counter is then used to route the program to the proper subroutine to determine the answer.

The expression FNNUM(C) is a user-defined function used to determine whether e character is numeric. Characters 48-57 in the ASCII sequence are numeric digits.

The decimal point (ASCII 46) is included to instruct the program to process digits to the right of the decimal point. To use this function it must first be defined (line 120). It is a Boolean expression, which means that it determines whether something is true or false. If a Boolean expression is assigned to a variable, the variable may be used in place of the expression in an If statement. Mathtalk will probably run without modification on a Model I or III with Disk Basic.

Operation synonyms such as *plus*, *and*, *added to* can be inserted in the data statement before the word *stop* as long as they do not reverse the expected order of the numbers. Questions like "what is 5-3?" and "what is 5 minus 3?" are equivalent, while "what is 5 subtracted from 3?" is not. New classes of operations can be created to take care of these exceptions.

Questions as complex as "if you take 2.56 and add 5.7 to it what would you get?" may be answered correctly because the program ignores everything except "2.56 *and* 5.7." Such occurrences are merely lucky side effects. The program is not intelligent, it merely takes advantege of the way we normally phrase questions about two numbers and uses programming tricks to determine the answer. You needn't tell your friends though.

Pixprint

This is a graphics screen print utility written in Extended Color Basic using machine language subroutines to dump the graphics screen to a Line Printer VII. It works in either PMODE 3 or 4, but is best in PMODE 4. PMODE 3 sometimes produces unexpected results because of the program's inability to produce more than one shade of grey.

Save a copy of Pixprint before running it. Any error in the date could cause a crash with no recovery.

To use Pixprint, set the selector switch on the back of your LPVII to the eight bit position. Put in your graphics program and hit the Break key when the screen is the way you want it. Load and run Pixprint. In a few minutes your printout should be done.

Some Basic customizing is possible. Change the start and end values in the For statement in line 480 to select screen portions. Consult the memory map in the *Extended Color Basic Manual* for addresses. Do not change the step value.

After using Pixprint, turn off both the printer and the computer and power up again. This will remove the printer driver routine which stays active even after the Basic program has been deleted.

The last four screen lines are not dumped to the printer because you must print seven lines at a time (it's a seven-wire printer). Seven does not go into 192 (the vertical resolution) evenly, so the remainder is dropped. This is the easy way out. If the memory above the end of page four is clear or contains more graphics, you can extend the range of the For statement. All eight pages can be dumped at once using this method.

Tank-Gun

Tank-Gun is a real-time arcade/simulation game with sound and high resolution color graphics for two players using joysticks.

The scenario is similar to games like Pillbox and Mountain Shoot. Two players take turns entering gun angle and muzzle velocity to fire at each other over a mountain. Tank-Gun uses a real-time entry of all game parameters. Instead of having to stop the game and take turns at the keyboard, players can change gun angle or muzzle velocity and fire at any time using joystick input. Pressing both fire buttons at the same time is no problem. The guns will tire simultaneously.

CN—Number of colors
L—Length of color bar
M—Number of notes
Y—Maximum number of note/bars
D—Duration of note
C—Temporary variable
N(Y)—Note/bar array
B(M)—Note-pitch array
I$—Keyboard input: INKEY$
V—Value of I$
I,J,K—Loop variables

Table 2. Poindexter Variable List

Only one shot per player is allowed in the air at any time. The end of a shot is when the shell makes contact with a solid object or goes off the screen in any direction but up.

A typical game: The screen clears end the program asks if winds are desired. If the answer is yes, a readout of wind force and direction is provided; otherwise winds are zero.

The game screen has two tanks positioned on either side of a randomly large mountain. The gun barrels appear and flash, signalling the program is ready.

Gun angle is fairly easy to obtain. Each tank's gun moves up and down in response to the joystick. Muzzle velocity is based on previous experience or initially, guessed. Velocity increases as you move the joystick toward the other tank. The center is a good place to start. Once the button is pressed, angle and velocity are set and cannot be changed until your next shot. While the shot is in the air, the gun barrel locks in position and stops flashing.

It is advisable to not move the joystick during e shot to maintain your frame of reference for the next shot. A direct hit explodes the tank, leaving behind a blasted hulk. The program then displays the score and again asks the winds question.

Tank-Gun Dissection

This may be useful to you for writing games of your own. Explosions are common in arcade games. The Play function of Extended Color Basic cen produce realistic sounding explosions. A$, as defined in line 160, can be used for lerge explosions, while B$, defined in line 170, is used for sharp reports such as a gun firing. You only need to insert Play A$, or B$, where you wish the explosion to occur.

Visual explosions are more difficult and should be tailored to each individual game. The explosions in Tank-Gun are different depending on what the projectile hits.

When two shells collide in the air, the result is complete destruction of both. When the

F1—If true then left tank has shot in air
X1,Y1—Coordinates of left tank
S1—Score for left tank
A1,V1—Angle and velocity of left tank's shell
T1—Time coordinate of left tank
F2,X2,Y2,S2,V2,A2,T2—Same as above for right tank
XO,YO—Coordinates of the end of left tank's barrel
XT,YT—Coordinates of the end of right tank's barrel
F3—If true then at least one tank destroyed
BT—Fire button: one—both buttons, two—left, three—right
TS—Time step
S—Start time
X4,Y4—Coordinates of left tank shell
XA,YA—Coordinates of right tank shell
TK—Tank graphic array
W—Wind force
C1,C2,K1,K2—Parametric equation constants
LI—Joystick limit. 63
N,M—Coordinates of mountaintop

Table 3. Tank-Gun Variable List

shell hits the mountain, the flash is above ground and cracks are left in the mountain. A direct hit on the tank will partially destroy it. All these effects are produced by the same subroutine.

First a yellow border is drawn around the explosion area. The inside is painted red stopping at the yellow. This destroys blue tanks, but leaves yellow mountains alone. The inside is then painted green, stopping at yellow, and the border is redrawn in green erasing all traces of the explosion except for cracks in the mountain. A short delay must be inserted in order to see the red flash.

The main loop is between lines 450-520. The joysticks are read and the information converted to a usable form. The program then checks flags to see if either tank has a shell in the air. If it does, the shell position is updated and checked for collision; otherwise the gun barrel position is updated.

A flag is then checked to determine if a tank has been destroyed. If at least one tank has been destroyed, the program checks to see if there is still a shell in the air. If there is, the program continues until shot end, otherwise it ends and displays the score.

If the program continues, a branch to a subroutine is made depending on the condition of the joystick buttons. The program then loops back and starts the whole process over.

Standard parametric equations for earth's gravity are used to cause the projectile to fall back to the bottom of the screen. To experiment with the gravity constant, change G in line 360.

Game Writing Tips

Arcade programming is as challenging as it is misunderstood. The only book I recommend is *Principles of Interactive Computer Graphics* by Newman Sproull, published by McGraw-Hill. Beware of books on how to build video games. Most of these are hardware-oriented.

To program arcade games successfully you should have some knowledge of Assembly language, mathematics and physics. Those of you who are already familiar with the basic concepts of microcomputers should obtain a copy of *6809 Assembly Language Programming* by Lance Leventhal, Osborne/McGraw-Hill. Another book I have found useful is the *CRC Standard Mathematical Tables* published by CRC Press.

Not all arcade games require such extensive knowledge. But programs which attempt to simulate portions of the real world must operate by the same natural laws and principles—laws best described in the language of mathematics.

But computers are not limited to reality when it comes to games. Don't wait for someone else to write your favorite game, do it yourself! And when you are finished, don't forget about the rest of us. ■

Larry Becker is a research scientist with the Georgia Institute of Technology.

```
100 ' FOR COLOR BASIC
110 ' BY LARRY BECKER
120 'USE LEFT JOYSTICK
130 CLS:INPUT "NUMBER OF BALLS";NB
140 C=4:BC=4  'COLOR, CHANGE TO SUIT
150 FOR I=1 TO 8 'BUILD PADDLE
160 READ D:P$=P$+CHR$(D)
170 NEXT
180 DATA 128,128,172,172,172,172,128,128
190 GOSUB 450 'DRAW BOARD
200 PP=16:SC=0
210 FOR N=1 TO NB
220 IF RND(2)=1 THEN XD=1 ELSE XD=-1
230 BX=5+RND(50):YD=1:BY=17
240 PD=INT(JOYSTK(0)/12.8-2):PP=PP+PD
250 IF PP>25 THEN PP=25 ELSE IF PP<3 THEN PP=3
260 PRINT@ 478+PP,P$;
270 RESET(BX,BY):BX=BX+XD:BY=BY+YD
280 IF BX<6 THEN XD=-XD:BX=6:SOUND 170,1:GOTO 300
290 IF BX>57 THEN XD=-XD:BX=57:SOUND 180,1
300 IF BY<5 THEN YD=1:BY=5:SOUND 190,1
310 IF BY>=29 THEN BY=29:T=BX-PP*2:IF T>=0 AND T<8 THEN YD=-1:SO
UND 200,1:ON T+1 GOSUB 410,410,420,420,430,430,440,440 ELSE 340
320 IF POINT(BX,BY)>0 THEN T=((BX-2) AND 124)+2:SOUND 140,1:FOR
I=T TO T+3:RESET(I,BY):NEXT:YD=-YD:SC=SC+17-BY:PRINT@ 4,"  "SC;:
IF (SC/715)=INT(SC/715) THEN GOSUB 460:BY=6
330 SET(BX,BY,BC):GOTO 240
340 FOR I=1 TO 4:SOUND RND(200)+50,1:NEXT
350 PRINT@ 18,"BALLS";NB-N;
360 NEXT N
370 PRINT@11,"PLAY AGAIN (Y/N)";:INPUT Q$
380 IF Q$<>"N"THEN 190
390 CLS:END
400 'SUBROUTINES
410 XD=-2:RETURN
420 XD=-1:RETURN
430 XD=1:RETURN
440 XD=2:RETURN
450 CLS0 'DRAW BOARD
460 FOR I=4 TO 59
470 SET(I,3,C):SET(I,4,C)
480 FOR J=7 TO 16:SET(I,J,C):NEXT
490 NEXT I
500 FOR I=5 TO 29
510 SET(4,I,C):SET(5,I,C)
520 SET(58,I,C):SET(59,I,C)
530 NEXT I
540 RETURN
```

Program Listing 1. Brickout

Program Listing 2. Poindexter

```
100 '-IN COLOR BASIC-
110 ' BY LARRY BECKER
120 'USE KEYS 1 THROUGH 4
130 CN=4:L=5:M=4:Y=32:D=10
140 DIM N(Y),B(M)
150 CLS0
160 FOR I=1 TO CN
170 READ C
180 FOR J=1 TO L
190 A$(I)=A$(I)+CHR$(C)
200 NEXT J
210 DATA 159,191,223,175
220 NEXT I
230 FOR I =1 TO M:READ B(I):NEXTI
```

Program Listing 2 Continues

Overcome CP/M Limitations

TurboDOS

The Professional CP/M-Compatible Operating System

- **CP/M Compatible** Virtually any CP/M (ver. 2.x) program will run under TurboDOS without modification. Fully media compatible with standard CP/M-format diskettes.
- **Spectacular Performance** Programs run 3-10 times faster than TRSDOS or CP/M. Benchmark results to 20 times faster with some applications, as tested by an independent firm.
- **Double-Sided Drive Support** Provides 1.25 MBytes of Storage per 8" double-sided density disk. Intermix combinations of single or doubles sided drives on line.
- **Expanded Directories** Store more files and information per disk.
- **Automatic Density/Side Recognition** Detects changes in disk format automatically. Change disks at any time without compromising data or "BDOS Read-Only" errors.
- **Fast Disk Backup** Copy an 8" SS/DD diskette (610K) in less than 80 seconds. Copy a double sided density diskette (1.25 MBytes) in under 1 min. 45 sec.
- **Hard Disk Drive Support** Supports large hard disks in excess of 1,000 MBytes without partitioning.
- **Advanced Utilities** Complete set of disk utilities, system date and time functions, communications channel interface, and more included.
- **Enhanced Automatic Print Spooling** Run multiple printers simultaneously. Supports multiple queues and printers on spooling versions, standard.
- **Advanced Mainframe-like Features** Includes read-after-write validation of all disk update operations, type-ahead buffers, incremental disk backup utility, password/log-on security, system date and time functions, accepts string of multiple commands, and many other capabilities not available under CP/M or TRSDOS. Multi-user networking versions also available.

Versions for TRS-80 Mod II & Xerox 820.
Print spooling option $50 additional.
Adaptable to any Z80-based computer.

Only $249

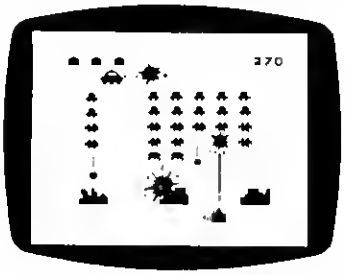
Manual $25 refundable with purchase.

D·R DATA-RX, INC. ↙292
686 Lighthouse Ave., Monterey, Ca 93940
(408) 375-2775

TURBODOS is the registered trademark of Software 2000
CP/M, MP/M and CP/NET are registered trademarks of Digital Research. Dealer OEM Inquiries Invited

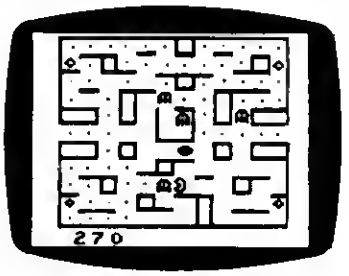
TRS 80 **COLOR COMPUTER** TRS 80

SPECTRAL ASSOCIATES, the LEADER in TRS-80 Color Computer software, presents the best in 16K machine language, fast action, high resolution arcade games. Extended Basic not required.



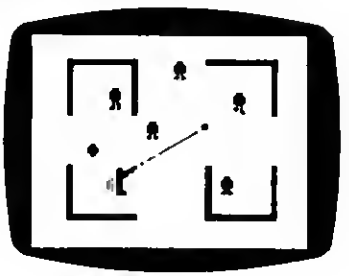
COSMIC INVADERS

The best invaders type game available. Complete with 16 skill levels, dynamite sound and 4 color hi-res graphics. Can you dodge the bombs long enough to blast the alien ship and invaders? $21.95.



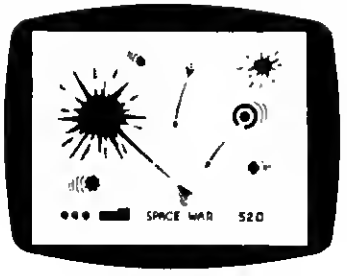
GHOST GOBBLER

An exciting version of the popular PAC-MAN game with power dots, 8 bonus shapes, super sound and 16 skill levels. Hours and hours of challenging fun. Joysticks $21.95



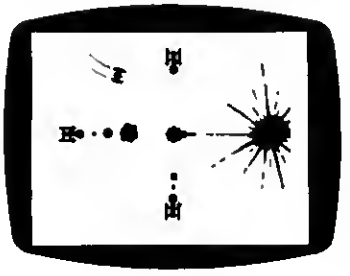
ROBOT BATTLE

Can you dodge the never ending horde of robots while avoiding the fatal touch of the Android? Realistic voices and 16 skill levels provide a tremendous arcade type challenge. Joysticks, $21.95.



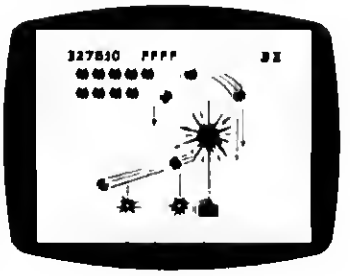
SPACE WAR

Maneuver your spaceship through the defenses of the Death Star for the killing shot while avoiding space mines, enemy ships and the gravity pull of the BLACK HOLE. Two color hi-res graphics - $21.95 Joysticks



COLOR ZAP

Super new space game! You must dodge the incoming photon torpedos before they can penetrate the defenses of your ship. Once you think you've got the upper hand, defensive fighters may appear and attack. $9.95



GALAX ATTAX

If you like Space Invaders, you'll love Galax Attax! Alien fighters leave formation to attack your ground base and you must fight them off! Exciting, fast-action machine language game with super sound and high resolution graphics. 16K and joysticks required. $21.95

NEW 16K MACHINE LANGUAGE GAMES

- KEYS OF THE WIZARD $19.95
  Best new adventure game available - over 200 rooms filled with creatures, tricks, treasures, magic spells. Cassette save feature built in.
- COLOR OUT $9.95
  Like Breakout, you must knock out six layers of blocks using your paddle to prevent missiles from escaping. Joysticks optional.

SUPERCHARGER

If you have a 32K E series printed circuit board, the **SUPERCHARGER** will let you switch your computer to full 64K RAM mode. It just plugs into the ROM PAK port and you can use BASIC or not as you wish. NO MODIFICATION is needed and it will not void your warranty. It allows you to still plug ROM pack and/or the disk controller board into the computer. ONLY $39.95

THE FACTS

At last, a complete description of the "guts" of the Color Computer. Specs on all the ICs, complete schematics, theory of operation and programming examples.

$14.95

FLEXPLUS DOS

FLEXPLUS is a powerful, easy-to-use disk operating system. Spectral Associates has adapted TSC's FLEX to the best DOS completely compatible with Radio Shack software for use on the Color Computer. Eliminate the need for Radio Shack's TRS DOS - use **FLEXPLUS** with Editor/Assembler and have the options of a full range of utilities. **FLEXPLUS** works on the 32K Radio Shack disk system with 64K memory chips with a High Resolution multi-screen format that supports a 24 line by 51 character display! Also included are special enhancements to Radio Shack's Disk system when you are running FLEX with single or double sided, single or double density, 35, 40 and 80 track drives.

Advantages of FLEXPLUS are:

- Best price anywhere
- Easy start-up — just type "RUN FLEX+"
- Allows you to save RS compatible disk files from **FLEXPLUS**
- All FLEX compatible software will run including INTERUPT DRIVEN SOFTWARE
- NO HARDWARE MODIFICATIONS NEEDED
- Warranty will not be voided — no need to open computer
- Wide range of available software
- Requires Supercharger board
- $149.95 for **FLEXPLUS**, Editor/Assembler and Supercharger

UTILITIES

- EDITOR/ASSEMBLER $34.95
- SUPER MONITOR 19.95
- EPROM PROGRAMMER 89.95
  (Program your own ROMs for the ROM-PAC port)
- MAGIC BOX 24.95
  Load MOD I/III Basic Tapes into color computer

SPECTRAL ASSOCIATES

145 Harvard Ave.
Tacoma, Washington 98466
(206) 565-8483

WRITE FOR COMPLETE CATALOG
ADD 3% FOR SHIPPING NO COD
VISA OR MASTERCHARGE ACCEPTED
All prices in U.S. funds

ORDERS ONLY TOLL FREE

800-426-1830 ✓119

✓See List of Advertisers on page 338

COMMUNICATE FREE

* MODEL III 48K with Dual Tandon Disk Drives $1,995.00

* MODEL III UPGRADE $679.95
Includes One 40 track Tandon Disk Drive, MDX-3 and Installation kit

* MDX-3 (Completed) $324.95
fully assembled Disk Controller board, RS232 and built in Phone Modem

* MDX-3 (Bare board with Manual) $ 74.95

* INSTALLATION KIT $119.95
Includes Disk Mounting hardware and Power Supply and Cables

Island Computer Services Model III TRS 80 system and Model III Upgrade come complete with Micro-Designs MDX-3 Disk controller board including a built-in 300 Baud direct connect phone Modem with answer and originate modes, and serial interface with both RS232 and 20Mk loop ports.

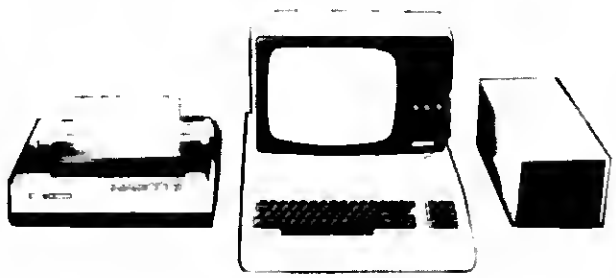
ISLAND
COMPUTER SERVICES

PHONE: 206-675-3632
DATA: 206-675-9786
P.O. BOX 804, Oak Harbor, Wash. 98277

413 Mastercard or Visa accepted

NOW AVAILABLE!!! The MDX-5
MODEL III INSTALLABLE 300 BAUD DIRECT CONNECT PHONE MODEM WITH ANSWER AND ORIGINATE MODES AND RS232 SERIAL INTERFACE. USABLE ON MOST MODEL III SYSTEMS

LNW80 COMPUTERS



IN STOCK NOW!! CALL FOR SPECIAL PRICES ON LNW80s, NEC PRINTERS, RGB COLOR MONITORS, AND TANDON DISK SYSTEMS.

***** NEW LNW SOFTWARE! *****

EXCELLONIX

7180 WOODROW WILSON DR
LOS ANGELES, CA 90068

(213) 650-5754 - (714) 973-1939

Program Listing 2 Continued

```
240 DATA 89,133,147,176
250 FOR I=1 TO Y:N(I)=RND(4):NEXT I
260 FOR I=1 TO Y
270 D=D-.5:IF D<1 THEN D=1
280 FOR J=1 TO I
290 PRINT@ 225+6*N(J),N(J);
300 PRINT@ 256+6*N(J),A$(N(J));
310 SOUND B(N(J)),D:CLS0
320 NEXT J
330 FOR J= 1 TO I
340 I$=INKEY$:IF I$="" THEN 340
350 V=VAL(I$)
360 IF V<>N(J) THEN 420
370 PRINT@ 256+6*V,A$(V);
380 SOUND B(V),3:CLS0
390 NEXT J
400 FOR V=1 TO 600:NEXT V
410 NEXT I
420 FOR K=1 TO 3
430 CLS(K):SOUND 5,4
440 NEXT K
450 CLS1
460 PRINT I;" NOTES PLAYED -HIT ANY KEY-"
470 IF INKEY$="" THEN 470
480 RUN
```

```
100 'MATHTALK  -IN EXTENDED COLOR BASIC-
110 ' BY LARRY BECKER
120 DEF FNNUM(C)=(C>=48 AND C<=57) OR C=46
130 CLS:PRINT"HELLO, I AM YOUR SUPER"
140 PRINT"MATHEMATICAL COMPUTER, ASK ME"
150 PRINT"ANY QUESTION INVOLVING 2 NUMBERS"
160 PRINT:INPUT A$
170 IF RIGHT$(A$,1)="?" THEN A$=LEFT$(A$,LEN(A$)-1)
180 D=1:RESTORE
190 READ B$
200 IF B$="STOP" THEN D=D+1:GOTO190
210 IF B$="END" THEN 250
220 GOSUB 510
230 IF P<>0 THEN 200
240 GOTO 190
250 PRINT"I MUST BE DENSE"
260 PRINT"I CAN'T UNDERSTAND YOU."
270 GOTO 160
280 FOR I=P TO 1 STEP-1
290 C=ASC(MID$(A$,I,1))
300 IF FNNUM(C) THEN 330
310 NEXT I
320 GOTO 250
330 FOR J=I TO 1 STEP-1
340 C=ASC(MID$(A$,J,1))
350 IF NOT(FNNUM(C)) THEN 370
360 NEXT J
370 N1=VAL (MID$(A$,J+1,I-J))
380 FOR I=P TO LEN(A$)
390 C=ASC(MID$(A$,I,1))
400 IF FNNUM(C) THEN430
410 NEXT I
420 GOTO 250
430 FOR J=I TO LEN(A$)
440 C=ASC(MID$(A$,J,1))
450 IF NOT(FNNUM(C)) THEN 470
460 NEXT J
470 N2=VAL(MID$(A$,I,J-I))
480 ON D GOSUB 530,540,550,560,570
490 PRINT N1;MID$(A$,P);" IS ";A
500 GOTO 160
510 P=INSTR(A$,B$)
520 RETURN
530 A=N1+N2:RETURN
540 A=N1-N2:RETURN
550 A=N1*N2:RETURN
560 A=N1/N2:RETURN
570 A=N1^N2:RETURN
580 DATA +,PLUS,AND,ADDED TO,STOP
590 DATA -,MINUS,STOP
600 DATA *,TIMES,MULTIPLIED BY,STOP
610 DATA /,DIVIDED BY,OVER,STOP
620 DATA ^,RAISED TO THE,END
```

Program Listing 3. Mathtalk

Program Listing 4. Pixprint

```
100 'GRAPHICS SCREEN PRINT
110 ' BY LARRY D. BECKER
120 'SET LP VII SWITCH TO 8 BIT
130 CLEAR 300,&H3F33
140 M=&H3F33
150 DEF USR1=M
160 READ D$:D=VAL("&H"+D$)
170 IF D=&H100 THEN 190
180 POKE M,D:N=M+1:GOTO 160
190 DATA 10,AE,02,E6,04,34,04,86
200 DATA 80,A7,A0,5A,26,FB,F7,03
210 DATA B2,EE,02,BE,03,B0,86,80
220 DATA 1F,12,C6,01,34,02,A4,A4
230 DATA 35,02,27,0B,F7,03,B2,34
240 DATA 04,EA,C4,E7,C4,35,04,31
250 DATA A8,20,58,C1,80,26,E5,6A
260 DATA E4,27,09,33,41,44,24,D8
270 DATA 30,01,2B,D2,35,02,F6,03
280 DATA B2,BD,B4,F4,39
290 DATA B6,7E,B7,81,67,8E,3F,BC
300 DATA BF,81,68,39,34,04,D6,6F
310 DATA C1,FE,35,04,27,0E,10,BE
320 DATA 80,00,10,BC,45,58,26,03
330 DATA 7E,82,73,39,32,62,34,17
340 DATA 1A,50,8D,30,5F,8D,2F,C6
350 DATA 08,34,04,5F,44
360 DATA 59,58,8D,25,35,04,5A,26
370 DATA F3,8D,1C,35,03,B1,0D,27
380 DATA 08,8C,9C,D6,9C,D1,9B,25
390 DATA 06,8F,9C,8D,14,8D,12,F6
400 DATA FF,22,54,25,FA,35,94,C6
410 DATA 02,F7,FF,20,8D,00,9E,95
420 DATA 8C,9E,97,7E,A7,D3,100
430 EXEC &H3F80
440 SCREEN 1,0
450 POKE &H3B0,6:POKE &H3B1,0 'TELL GRAPHICS DRIVER WHERE SCREEN
 IS
460 A$=STRING$(255,255)  'SET A$ TO MAX LENGTH
470 'LOOP FOR WHOLE SCREEN
480 FOR SP=&H600 TO &H1DFF-223 STEP 224
490 LB=SP AND &HFF : HB=INT(SP/256)
500 POKE &H3B0,HB:POKE &H3B1,LB
510 'INSERT THE FOLLOWING LINE WHERE YOU WISH TO PRINT SEVEN PIX
EL LINES
520 IF USR1(A$) THEN PRINT #-2,CHR$(18);CHR$(27);CHR$(16);CHR$(0
);CHR$(111);A$;CHR$(26) ELSE PRINT #-2,CHR$(26)
530 NEXT SP
540 END
550 PRINT@ 10,"TANK GUNNER":PRINT
560 PRINT "   LEFT TANK","  RIGHT TANK"
570 PRINT "     SCORE",  "      SCORE":PRINT
580 S1=S1+H1 : S2=S2+H2
590 H1=0:H2=0
600 PRINT TAB(6) S1 TAB(22) S2
610 PRINT:PRINT
620 GOTO 110 'REDRAW BOARD
630 END
640 'EXPLOSION SUBROUTINE
650 D$="BM"+STR$(INT(X3+14))+","+STR$(INT(Y3+19))
660 COLOR 2,1  'YELLOW BOARDER
670 DRAW D$+C$
680 PAINT(X3+14,Y3+6),4,2 'RED
690 FOR I=1 TO 10:NEXT I
700 PAINT(X3+14,Y3+6),1,2 'GREEN
710 COLOR 1,3 'UNDRAW BOARDER
720 DRAW D$+C$
730 COLOR 3,1 'COLOR TO NORMAL
740 PLAY A$
750 RETURN
760 'POSITION TANKS AND DRAW MOUNTAINS
770 X1=RND(30)
780 Y1=191-RND(50)-20
790 PUT (X1,Y1)-(X1+20,Y1+20),TK,PSET  'LEFT TANK
800 X2=RND(30)+197
810 Y2=191-RND(50)-20
820 PUT (X2,Y2)-(X2+20,Y2+20),TK,PSET  'RIGHT TANK
830 DT=X2-X1
840 COLOR 2,1  'YELLOW
850 LINE (0,Y1+20)-(X1+30,Y1+20),PSET
860 LINE (X2-8,Y2+20)-(255,Y2+20),PSET
870 LINE (0,Y1+20)-(0,191),PSET
880 LINE (0,191)-(255,191),PSET
890 LINE (255,Y2+20)-(255,191),PSET
900 M=(Y1+Y2)/2-20-RND(60)
910 N=X1+RND(14)+DT/2
920 'DRAW MOUNTAIN
930 LINE (X1+30,Y1+20)-(N,M),PSET
940 LINE (N,M)-(X2-8,Y2+20),PSET
950 PAINT (N,M+2),2,2 'PAINT IT YELLOW
960 COLOR 3,1
970 RETURN
980 'RIGHT TANK FIRE SUBROUTINE
990 IF F2 THEN RETURN ELSE F2=1
1000 C2=V2*SIN(A2)
1010 C1=V2*COS(A2)+W
1020 PLAY B$
1030 XA=0:YB=0
1040 RETURN
1050 'LEFT TANK FIRE SUBROUTINE
1060 IF F1 THEN RETURN ELSE F1=1
1070 K1=V1*COS(A1)
1080 K2=V1*SIN(A1)
1090 PLAY B$
1100 X4=0:Y4=0
1110 RETURN
1120 'UPDATE LEFT TANK'S FIRE
1130 T1=T1+T5 'INCREASE TIME
1140 IF Y4>0 THEN X5=X4:Y5=Y4
1150 X4=K1*T1+P1:Y4=Q1-(K2*T1-G*T1*T1)
1160 PRESET(X5,Y5)
1170 IF X4>255 THEN F1=FALSE:T1=S:RETURN
1180 IF Y4<0 THEN RETURN
```

Program Listing 4 Continues

Introducing...

Data-Writer™

A powerful information processing system that interfaces text processing and data management.

Users have praised Midwest Data System's Auto-Writer for its unique, versatile approach to data base management.

Now DATA-WRITER does even more:

- New Data Entry program to create your data base or add records to an existing data base. It has error checking features and supports both fixed and variable length fields.
- New File Editor lets you edit your data base without an independent word processor. Or, if you prefer, use your own word processor (Electric Pencil, Lazy Writer or Scripsit) to create and edit your data base.
- New Field Manager that lets you add, delete, re-order or append fields and merge or split data bases.
- New interactive, double-precision Math program that processes up to 20 equations of up to 255 characters using numbers you enter and your data base field labels. It includes an in-memory scratch pad to store temporary values. Insert them into other equations for a cascade of increasingly complex mathematical statements. Store your series of equations on disk as procedure files to use any time you need them.
- New two-level Sort that enables you to use nested sorts for complex ordering of data files. Sort on any field without having previously designated it as a key.
- New Mailing Label program that allows you to print multiple labels from one to four across and to insert a variable from the keyboard or a fixed message on every label.
- Form Letter processor that allows you to insert data from your data base into a form letter or contract.
- Report Generator for columnar tabulations with automatic headings, pagination, totals and subtotals, and sophisticated formatting control. **DATA-WRITER'S** unique flexibility enables you to modify your report format as you wish, without the need to scrap it and start fresh.
- Powerful Select-If command that lets you define a subset of your data base. New instring selection capabilities. With Select-If and Sort, you can create dozens of new data bases for specific purposes.
- Statistical check on your data base to locate data entry errors. Stats also reports maximum entered data length for each defined field, a tremendous aid when designing a report.

DATA-WRITER is both powerful and easy to use. It has speed and versatility not available in any so-called data base management system. As one Auto-Writer user said, "Why hasn't someone done this before!"

For the TRS-80 Model I/III (48K, 2 disk drives, lower case required). Available at your favorite software store, or order from **Software Options,** 19 Rector Street, New York, N.Y. 10006. 212-785-8285. **Toll-free order line: 800-221-1624.** Price: $125 (plus $3 per order shipping and handling). New York State residents add sales tax. Visa/Mastercard accepted.

SOFTWARE OPTIONS INC™

-537

See List of Advertisers on page 338

MARKET ANALYSIS.

Easier...and Faster.

NEW GENERATION!
Programs for your personal computer.

STOCK TRACKER™ uses our technical Volume Force™ analysis to give buy and sell signals on individual stocks, stock options, and commodities. Telecommunications package optional. From $285.

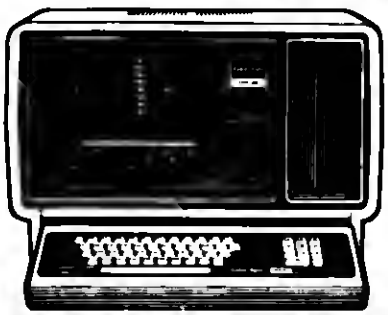
MARKET TRACKER™ is a composite of six technical indicators which tell when the Dow turns bullish and bearish. Its 4-year track record is available. $225.

H & H
TRADING COMPANY
Post Office Box 549
Clayton, CA 94517
415/672-3233

✓166

THE BIGGEST NAME IN LITTLE COMPUTERS™

TRS-80™ Model II—Your Best Buy In a Business Microcomputer



UP TO 15% OFF! on **TRS-80™ computers, software and peripherals**

Similar values on all merchandise
CALL COLLECT:

800-351-1580

Texas Residents call: 915-283-2920

Van Horn Office Supply ✓169
701 W. Broadway -- P O Box 1060
Van Horn, Texas 79855

DEALER GO55
Form F48 Provided
Standard Warranty in Effect

THE NATIONWIDE SUPERMARKET OF SOUND™

Program Listing 4 Continued

```
1190 ON PPOINT(X4,Y4)-1 GOTO 1250,1220,1280
1200 PSET(X4,Y4,4)
1210 RETURN
1220 F1=FALSE:F3=1:T1=S:H1=1
1230 X3=X2:Y3=Y2:GOSUB 640:T1=S
1240 LINE (P2,Q2)-(B2,D2),PRESET:RETURN
1250 F1=FALSE:X3=X4-14:Y3=Y4-10:GOSUB 640:T1=S
1260 PUT (X2,Y2)-(X2+28,Y2+20),TK,PSET
1270 GOTO 1560
1280 X3=X4-14:Y3=Y4-10
1290 GOSUB 640:T1=S:T2=S
1300 F1=FALSE:F2=FALSE:RETURN
1310 'LEFT GUN SUBROUTINE
1320 XO=P1+L*COS(A1)
1330 YO=Q1-L*SIN(A1)
1340 LINE (P1,Q1)-(B1,D1),PRESET:LINE (P1,Q1)-(XO,YO),PSET
1350 B1=XO:D1=YO:RETURN
1360 'UPDATE RIGHT TANK'S FIRE
1370 T2=T2+TS
1380 IF YA>0 AND XA>0 THEN XB=XA:YB=YA
1390 XA=C1*T2+P2:YA=Q2-(C2*T2-G*T2*T2)
1400 PRESET(XB,YB)
1410 IF XA<0 THEN F2=FALSE:T2=S:RETURN
1420 IF YA<0 THEN RETURN
1430 ON PPOINT(XA,YA)-1 GOTO 1490,1460,1520
1440 PSET(XA,YA,4)
1450 RETURN
1460 F2=FALSE:F3=1:T2=S:H2=1
1470 X3=X1:Y3=Y1:GOSUB 640:T2=S
1480 LINE (P1,Q1)-(B1,D1),PRESET:RETURN
1490 F2=FALSE:X3=XA-14:Y3=YA-10:GOSUB 640 :T2=S
1500 PUT (X1,Y1)-(X1+28,Y1+20),TK,PSET
1510 GOTO 1320
1520 X3=XA-14:Y3=YA-10
1530 GOSUB 640:T2=S:T1=S
1540 F1=FALSE:F2=FALSE:RETURN
1550 'RIGHT TANK GUN SUBROUTINE
1560 XT=P2+L*COS(A2)
1570 YT=Q2-L*SIN(A2)
1580 LINE (P2,Q2)-(B2,D2),PRESET:LINE (P2,Q2)-(XT,YT),PSET
1590 B2=XT:D2=YT:RETURN
1600 'BOTH BUTTONS PUSHED
1610 IF F1 AND F2 THEN RETURN
1620 GOSUB 990
1630 GOTO 1060
1640 END 'PROGRAM TANK-GUNNER
```

```
0 'PROGRAM TANK-GUNNER
20 '   BY LARRY BECKER
30 'INSTRUCTIONS FOR TWO PLAYERS :
40 ' USE JOYSTICKS TO DESTROY THE ENEMY TANK
50 ' UP AND DOWN CONTROL THE SHOT ANGLE
60 ' MOVE THE JOYSTICK TOWARD THE TARGET FOR HIGHER MUZZLE VELOC
ITY
70 PMODE 3,1 '128X192
80 PCLEAR 4
90 DIM TK(28,20)
100 CLS
110 INPUT"DO YOU WISH WINDS (Y OR N)";QS
120 IF QS="N" THEN W=0 ELSE W=RND(20)-10
130 IF W>0 THEN PRINT "WINDS FROM LEFT AT FORCE";W ELSE PRINT "W
INDS FROM RIGHT AT FORCE";ABS(W)
140 PRINT"WAIT JUST A NANOSECOND, PLEASE"
150 'SET UP EXPLOSION STRINGS
160 A$="L255;O1V31BV30FV29DV28GV27EV25CV23FV21CV19GV17BV15;L210;
O2;D#V13C#V11F#V9DV7AV5BV3EV1C"
170 B$="L200;O1;V31BV28AV24GV20FV16DV10C#V5C"
180 C$="H4G3U3L4E4H4E4U2F4E4D3R4G3F2R3G4F3L3D2L2"
190 PCLS
200 COLOR 3,1
210 'DRAW TANK
220 CIRCLE (6,14),4,3
230 CIRCLE (14,14),4,3
240 CIRCLE (22,14),4,3
250 LINE (6,18)-(22,18),PSET
260 LINE (6,18)-(22,18),PSET
270 CIRCLE (14,18),8,3,1,.5,1
280 PAINT (14,6),3
290 GET (0,0)-(28,20),TK,G
300 PCLS
310 GOSUB 760 'DRAW BOARD
320 SCREEN 1,0
330 'SET CONSTANTS
340 FALSE =0
350 MASK=127:KO=123:LI=63
360 BU=65280:TS=.05:G=16:S=.1  'INCREASE TS TO MOVE POINTS FASTE
R
370 P1=X1+20:P2=X2+8
380 F1=FALSE:F2=FALSE:F3=FALSE
390 Q1=Y1+5:Q2=Y2+5
400 O=78:L=10
410 T1=.1:T2=.1
420 X4=-1:Y4=-1:X5=0:Y5=0
430 B1=P1:B2=P2:D1=Q1:D2=Q2
440 PI=3.14159256:PH=PI/3:M=PI/6:PM=PI-M:LP=LI*PH
450 'MAIN LOOP
460 V2=LI-JOYSTX(0)+O:V1=JOYSTK(2)+O:A2=PM-(LI-JOYSTK(1))/LP
470 A1=(LI-JOYSTX(3))/LP+M:BT=(PEEK(BU) AND MASK) - KO
480 IF F1 THEN GOSUB 1130 ELSE  GOSUB 1320
490 IF F2 THEN GOSUB 1370 ELSE  GOSUB 1560
500 IF F3 THEN IF F1 OR F2 THEN  510 ELSE 530
510 ON BT GOSUB 1610,1060,990
520 GOTO 460  'LOOP BACK
530 FOR I=1 TO 800:NEXT I
540 CLS: SCREEN 0,0
```

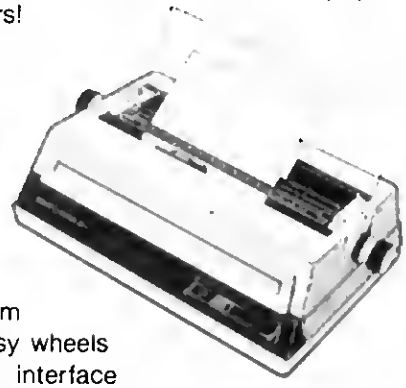
Program Listing 5. Tank-Gun

SCM

DAISY WHEEL

New Smith Corona TP-1
Price Breakthrough

True letter quality printer for less than the cost of an office typewriter! Priced $500 less than other popular daisy wheel printers!



SALE PRICE:
$739

FEATURES:

★ Friction feed
★ 15 cps, 120 wpm
★ Changeable daisy wheels
★ Parallel or serial interface
★ Compatible with R/S, Apple, etc.

SUNLOCK SYSTEMS
4217 Carolina Ave.
Richmond, Va. 23222

To order call collect, 0-804-321-9191
We accept MasterCard, Visa and CODs ✓456

Introducing...

ColorZAP™

A powerful utility that opens a window into the Color Computer's disks.

COLORZAP uses the power of the Color Computer to provide both rapid scanning and full screen modification capabilities. You can now examine, modify, and copy programs or data while they're stored on disk. Access them by filename or location.

COLORZAP is programmed largely in BASIC so that you can modify it if you'd like, but part of it is in machine language to provide fast response. All accesses to disk are performed with standard interfaces, so any standard Color Computer disk can be examined. You can directly access the disk's directory and control information to examine a clobbered disk, recover a killed file, or find parts of a file when other parts have been lost. With this new window into its disks, the Color Computer sheds its image as a toy. Now you can use this exciting machine like other powerful microcomputers.

For the TRS-80 Color Computer. Available on disk with an accompanying manual from **Software Options,** 19 Rector Street, New York, N.Y. 10006. 212-785-8285. **Toll-free order line: 800-221-1624.** Price: $49.95 (plus $3.00 per order shipping and handling). New York State residents odd sales tax. Visa/Mastercard accepted.

SOFTWARE OPTIONS INC™

✓537

T80-FS1 Flight Simulator

Available for Model I or Model III, $25.00 on cassette or $33.50 on disk (with enhancements) All versions require 16K.

If you order direct, please specify whether you have Model I or Model III (the media are different) and whether you want disk or cassette. Include $1.50 and indicate UPS or first class mail. Illinois residents add 5% sales tax. Visa and Mastercard accepted.

If you don't yet own a disk, don't fret. You can upgrade anytime. Cassette users may send back their cassette (but not the manual) along with $10 (first class shipping included) and receive the disk version.

subLOGIC

Communications Corp.
713 Edgebrook Drive
Champaign, IL 61820
(217) 359-8482
Telex: 206995

See your dealer!

Birth of a legend.

Epson.

A whole new generation of Epson MX printers has just arrived. And while they share the family traits that made Epson famous — like unequalled reliability and ultra-fine printing — they've got a lot more of what it takes to be a legend.

For instance, they've got a few extra type styles. Sixty-six, to be exact, including italics, a handy subscript and superscript for scientific notation, and enough international symbols to print most Western languages.

What's more, on the new-generation MX-80, MX-80 F/T and MX-100, you get GRAFTRAX-Plus dot addressable graphics. Standard. So now you can have precision to rival plotters in a reliable Epson printer. Not to mention true backspace, software printer reset, and programmable form length, horizontal tab and right margin.

All in all, they've got the features that make them destined for stardom. But the best part is that beneath this software bonanza beats the

Uh...three legends.

heart of an Epson. So you still get a bidirectional, logical seeking, disposable print head, crisp, clean, correspondence quality printing, and the kind of reliability that has made Epson the best-selling printers in the world.

All of which should come as no surprise, especially when you look at the family tree. After all, Epson *invented* digital printers almost seventeen years ago for the 1964 Tokyo Olympics. We were the first to make printers as reliable as the family stereo. And we introduced the computer world to correspondence quality printing and disposable print heads. And now we've given birth to the finest printers for small computers on the market.

What's next? Wait and see. We're already expecting. ↙97

EPSON
EPSON AMERICA, INC.
3415 Kashiwa Street • Torrance, CA 90505 • (213) 539-9140

FEATURE	ORIGINAL MX-80	GRAFTRAX-80*	ORIGINAL MX-100	MX-80 with GRAFTRAX-Plus	MX-80 F/T with GRAFTRAX-Plus	MX-100 with GRAFTRAX-Plus
Bidirectional printing	X	X	X	X	X	X
Logical seeking function	X	X	X	X	X	X
Disposable print head	X	X	X	X	X	X
Speed: 80 CPS	X	X	X	X	X	X
Matrix: 9 x 9	X	X	X	X	X	X
Selectable paper feed			X		X	X
PAPER HANDLING FUNCTIONS						
Line spacing to n/216		X		X	X	X
Programmable form length	X	X	X	X	X	X
Programmable horizontal tabs	X	X	X	X	X	X
Skip over perforation			X	X	X	X
PRINT MODES AND CHARACTER FONTS						
96 ASCII characters	X	X	X	X	X	X
Italics character font		X		X	X	X
Special international symbols				X	X	X
Normal, Emphasized, Double-Strike and Oouble/Emphasized print modes	X	X	X	X	X	X
Subscript/Superscript print mode				X	X	X
Underline mode				X	X	X
10 CPI	X	X	X	X	X	X
5 CPI	X	X	X	X	X	X
17.16 CPI	X	X	X	X	X	X
8.58 CPI	X	X	X	X	X	X
DOT GRAPHICS MODE						
Line drawing graphics				X	X	X
Bit image 60 D.P.I.		X	X	X	X	X
Bit image 120 D.P.I.		X	X	X	X	X
CONTROL FUNCTIONS						
Software printer reset		X		X	X	X
Adjustable right margin			X	X	X	X
True back space		X		X	X	X
INTERFACES						
Standard — Centronics-style 8-bit parallel	X	X	X	X	X	X
Optional — RS-232C current loop w/2K buffer	X	X	X	X	X	X
RS-232C x-on/x-off w/2K buffer	X	X	X	X	X	X
IEEE-488	X	X	X	X	X	X

* Tandy TRS-80 block graphics only available with GRAFTRAX 80.

↙ See List of Advertisers on page 338

All work and no play makes a good machine dull.

Sub Destroy, Model II Style

Patricia Steele
308 Dente
Glenwood, IL 60425

The Model II is not an all-work-no-play machine. Game playing is an enjoyable diversion from business tasks. We Model II users are not adverse to dropping a few depth charges on enemy submarines.

Imagine my dismay after keying in page after page of Leo Christopherson's "Android Nim," hitting Enter and seeing my screen display just a big splat. In all my years working on IBM mainframes, I never experienced such total failure. I thought this micro was going to be a piece of cake; instead, my computer spit crumbs at me. To give credit where credit is due, Mr. Christopherson taught me Level II Basic for my Model II. The game is now playable, but the Androids are still a mess.

In the June 1981 issue of *80 Micro* was a Sub-Destroy program written by John Cominio, in Level II Basic. I modified John's program for the Model II.

The Program

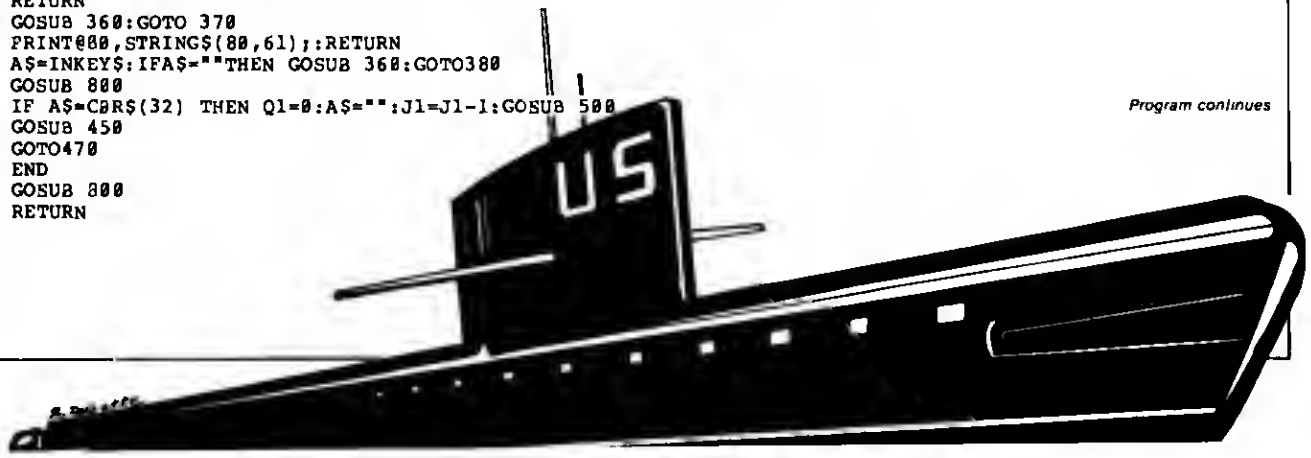
Lines 280–330 take the place of lines 180–230 of Mr. Cominio's program. The CHR$s between the two Basic languages are quite different. The subs and destroyer will also look different. The PRINT@ and value of Q had to be changed to coincide with the Model IIs screen print positions. ■

Patricia has worked with mainframe computers as a systems programmer for the last 15 years.

Program Listing

```
120 CLEAR 400
130 DEFINTA-A
140 RANDOM
150 CLS
160 PRINTTAB(15)"---------S U B   D E S T R O Y---------- ":PRINT:PRINT"DO YOU WANT
 INSTRUCTION (Y/N) ?"
170 R$=INKEY$:IF R$=""THEN 170
180 IF R$="Y" THEN 1000ELSE IF R$="N"THEN CLS:GOTO 190ELSE 170
190 Q=80:J1=20
200 GOSUB 210:GOTO350
210 E1$=STRING$(4,160)
220 E2$=STRIHG$(6,160)
230 A=RND(290):S=A+RND(250)
240 Z=RND(1220):IFZ>1220 OR Z < 420 THEN 230
250 IF Z+A > 1760 OR Z+A < 640 THEN 230
260 IF Z+A+S > 1760 OR Z+A+S < 960 THEN 230
270 X=960
280 L$=STRING$(79,172)
290 B2$=CHR$(160)+CHR$(153)+CHR$(150)+CHR$(150)+CHR$(153)+CHR$(153)
300 E$=STRING$(79,160)
310 B$=CHR$(153)+CHR$(133)+CHR$(135)+CHR$(153)
320 B1$=CHR$(153)+CHR$(153)+CHR$(135)+CHR$(153)
330 S$=CHR$(153)+CHR$(150)+CHR$(150)+CHR$(150)+CHR$(153)+CNR$(153)+CHR$(153)
340 RETURN
350 GOSUB 360:GOTO 370
360 PRINT@80,STRING$(80,61);:RETURN
370 A$=INKEY$:IFA$=""THEN GOSUB 360:GOTO380
380 GOSUB 800
390 IF A$=CHR$(32) THEN Q1=0:A$="":J1=J1-1:GOSUB 500
400 GOSUB 450
410 GOTO470
420 END
430 GOSUB 800
440 RETURN
```

Program continues



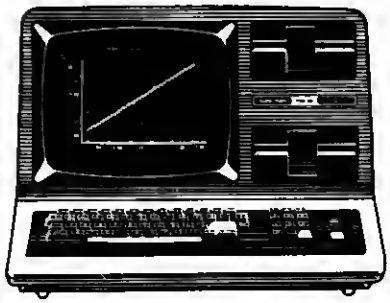
AMERICAN Small Business COMPUTERS

118 SO. MILL ST
PRYOR, OK 74361
(918) 825-4844

ALL PRICES ARE CASH DISCOUNTED 3%. C.O.D. AND CHARGE ORDERS ARE 3% MORE.
RETAIL LOCATION: 447 S. WOOD, PRYOR, OKLAHOMA 74361

DON'T PAY MORE!!

TRS-80 MODEL III



16K.....$825
48K.....$849
48K 1 DRIVE.....$1499
48K 2 DRIVE.....$1749

THERE'S NO SECRET

There's no secret as to why we can sell TRS-80 computer equipment for less. Low overhead — that's the reason — pure, simple and straight! As everyone knows, Radio Shack is a huge corporation...with huge expenses. We are able to buy the bare-bones computers from Radio Shack. To these computers, we add our own memory chips, disk drives, cables, etc. The result is a computer system which is equal to, or in many cases, superior to the one you would get from Radio Shack in both price and performance capabilities. There is one thing that you don't get from Radio Shack — their 90 day warranty. What you get in its place is the exclusive 180 days American Small Business Computer's Warranty. So...if you like the Radio Shack computer, but don't like the price...**CHECK US OUT!!!**

TRS-80 MODEL II

64K MODEL II WITH ONE DISK DRIVE

$3287.00

COLOR COMPUTER

4K LEVEL 1.....$318
16K LEVEL I.....$336
16K EXT. BASIC.....$435
32K EXT. BASIC.....$520
DRIVE I.....$499
DRIVE 2, 3, 4.....$250

16K RAM NOW ONLY $16.95

For MOD I, II, III Color Comp.

American Small Business Computers is not an authorized Radio Shack Dealer. We do not offer a Radio Shack 90 Day Warranty on our computers. Instead, we offer the American Small Business Computers **180 Day Warranty**. If you have a problem with your computer, return it to us for about 48 hours. If we can't fix it, we'll replace it!

MODEL I, III SOFTWARE

PROFILE.....$69.95
PROFILE III PLUS.....$175.00
VISICALE.....$87.95
VISICALE III.....$176.00
SCRIPSIT.....$87.95
SCRIPSIT DICTIONARY.....$175.00
SUPER SCRIPSIT.....$131.00

* TM Tandy Corp.

217

CALL 918-825-4844

Program continued

```
450 IF Q>153 THEN Q=00:PRINT@73,"          ";
460 GOSUB 750
470 GOSUB 570
480 PRINT@Q-80,E2$;:PRINT@Q-79,S$;:Q=Q+1:GOTO 370
490 GOTO750
500 IF Q+Q1+80 >X THEN PRINT@Q+Q1+80,"*****";:PRINT@Q+Q1-1,CHR$(32);:FOR R= 1 TO
10:NEXT R:PRINT@Q+Q1+80,"     ";:RETURN ELSE 510
510 GOSUB 360:PRINT@Q+Q1+80,CHR$(170);
520 GOSUB 570
530 IF Q+Q1+80 >= Z+S+A+1 AND  Q+Q1+80 < Z+S+A+12  THEN J=J+30: FOR P = 1 TO 10:
PRINT@Q+Q1+80,"****GLUG";:NEXT P: GOSUB 760:GOTO 560
540 IF Q+Q1+80 >=Z+A AND Q+Q1+80 < Z+A+8 THEN J=J+10:FOR P=1 TO 10:PRINT@Q+Q1+80
,"****GLUG";:NEXT P:GOSUB 760:GOTO 560
550 IF Q+Q1+80 >=Z+1 AND Q+Q1+80 < Z+8 THEN J=J+5:FOR P=1 TO 10:PRINT@Q+Q1+80,"*
***GLUG";:NEXT P:GOSUB 760
560 PRINT@Q+Q1+80,CHR$(170):PRINT@Q+Q1-1,CHR$(32):Q1=Q1+81:GOTO 500
570 PRINT@Z+4,B$;:Z=Z+1:GOSUB 430
580 PRINT@Z-1,E1$;
590 IF Z+A+S>1760  THENGOSUB 650
600 PRINT@Z+S+A+6,B2$;:S=S+1:GOSUB430
610 PRINT@Z+S+A-1,E2$;
620 PRINT@Z+A+4,B1$;:A=A+1:GOSUB 430
630 PRINT@Z+A-1,E1$;
640 RETURN
650 PRINT@1600,STRING$(160,160);
660 PRINT @Z+3,"     ";
670 PRINT @Z+A+2,"     ";
680 PRINT@Q+Q1+80,"  ";
690 Z=0:A=0:S=0:Z=RND(1220):IF Z > 1220 OR Z < 420 THEN 690
700 A=RND(290):S=RNO(250)
710 IF Z+A > 1760 OR Z+A < 640 THEN 690
720 IF Z+A+S > 1760 OR Z+A+S < 968 THEN 700
730 RETURN
740 Q1 = 0:Z2=0:Z1=0:Z4=0:A$="":GOSUB 750:FOR T = 1 TO 1000:NEXT:GOTO 300
750 PRINT@168,"SCORE=";J;:PRINT@174,"CHARGES LEFT=";J1;
760 IF J1 = 0 THEN 780ELSE RETURN
778 Q1=0:RESUME 370
780 GOTO 800
790 GOTO 790
800 IF A$=CHR$(30)THEN 810ELSE 840
810 IF X <= 400 THEN X = X + 80
820 X= X-80:PRINT@ X,L$;:FOR R = 1 TO 5: NEXT R:PRINT@X,E$;
830 A$="":RETURN
840 IF A$=CHR$(31) THEN 850ELSE RETURN
850 IF X >= 1760 THEN X = X - 80
860 X = X + 80:PRINT@X,L$;:FOR R = 1 TO 5:NEXT R:PRINT@ X,E$;
870 A$="":RETURN
880 CLS
890 IF J<35 THEN PRINT@ 0,"THE GAME IS OVER. YOU HAD ";J+JA;"TOTAL POINTS.";:GOT
O 1230ELSE 900
900 IF J > 34 AND J <= 150 THEN J1 = 2
910 IF J>150 AND J<=200 THEN J1 = 6
920 IF J>200 AND J<= 300 TBEN J1 = 9
930 IF J>300 AND J<= 500 TBEN J1=14
940 IF J>500 THEN J1 = 20
950 PRINT@0,"THE GAME IS OVER, BUT YOU ARE LUCKY."
960 PRINT"YOUR SCORE WAS";J;"AND THAT ENTITLES YOU TO";J1;"BONUS";
970 PRINT " NISSLES."
980 PRINT "CREDIT GAME NILL RESUME WHEN THE TIMER REACHES ZERO."
990 FOR R = 1000 TO 0 STEP-1:PRINT@640,R;:HEXT:CLS:Q=80:JA=J:J=0:A$ = "":GOTO 21
0
1000 CLS:PRINTTAB(10)"********** S U B  O E S T R O Y **********"
1010 PRINT:PRINTTAB(5)"THE OBJECT OF THE GAME IS TO TRY AND SINK THE SUBMARINES"
1020 PRINT"TRAVELING BELOW YOU. YOU CAN ACCOMPLISH THIS BY DROPPING OEPTH"
1030 PRINT"CHARGES FROM YOUR DESTROYER SHIP CRUSING AT THE SURFACE OF THE"
1040 PRINT"OCEAH. YOU MUST SET THE LEVEL WHERE YOU WANT THE DEPTH CHARGE"
1050 PRINT"TO EXPLODE. TO DO THIS YOU POSITION A WHITE LINE AT THE PROPER"
1060 PRINT "OEPTH. TO MOVE THE LINE YOU NAY USE THE UP ARROW  OR TRE"
1070 PRINT"DOWN ARROW .";
1080 PRINT " TO OROP YOUR CHARGES JUST PRESS THE SPACE BAR."
1090 PRINTTAB(5)"SCORING IS AS FOLLOWS:"
1100 PRINTTAB(10)"30 POINTS FOR THE LARGE SUBMARINE"
1110 PRINTTAB(10)"10 POINTS FOR THE SMALLER SOBMARINE"
1120 PRINTTAB(10)" 5 POINTS FOR THE SLOWEST SUBMARINE"
1130 PRINTTAB(5)"IF YOU SCORE WELL ENOUGH YOU WILL RECEIVE BONUS CHARGES."
1140 PRINTTAB(10)"POINTS  35 - 150 =  2 BONUS CHARGES."
1150 PRINTTAB(10)"POINTS 155 - 200 =  6 "
1160 PRINTTAB(10)"POINTS 205 - 300 =  9 "
1170 PRINTTAB(10)"POINTS 305 - 500 = 14 "
1180 PRINTTAB(10)"POINTS OVER  500 = 20 "
1190 PRINTTAB(10)"HIGHEST SCORE POSSIBLE IS 600"
1200 PRINT "THE HIGHER YOU SCORE THE MORE BONUS CHARGES YOU WILL RECEIVE. REMEMB
ER YOU HAVE 20 CHARGES TO START WITH. PRESS ENTER.";
1210 R$=INKEY$:IP R$=""THEN 1210
1220 IF R$=CHR$(13)THEN CLS: GOTO 198:60 ELSE 1210
1230 END
```

AMERICAN Small Business COMPUTERS

118 SO. MILL ST
PRYOR, OK 74361
(918) 825-4844

ALL PRICES ARE CASH DISCOUNTED 3%. C.O.D. AND CHARGE ORDERS ARE 3% MORE
RETAIL LOCATION 447 S. WOOD PRYOR, OKLAHOMA 74361

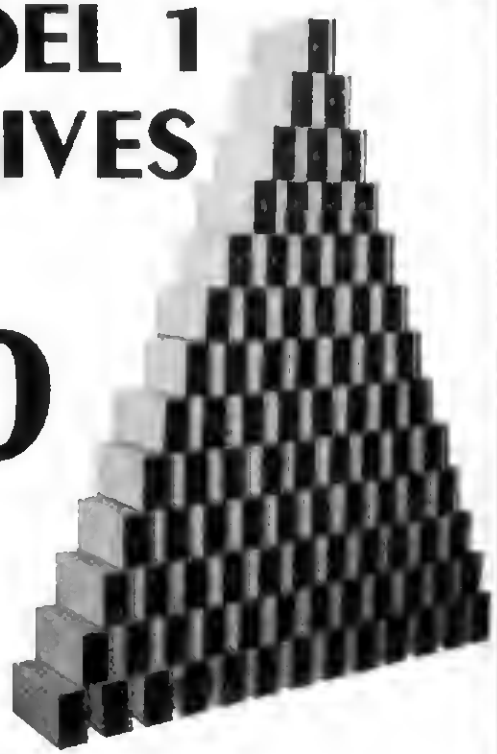
EPSON PRINTERS
180 DAY GUARANTEE!!!

We sell the complete EPSON line at the lowest prices!

If you don't believe it, give us a call. But, just as important, we offer an unprecedented **180 Day Warranty!** How do we do it? It's easy. We sell the most reliable printer in the world — EPSON!

-219

TRS-80* MODEL 1 MINI DISK DRIVES



Our Mini Disk Drives are based on the world famous TEAC Mini Disk Unit. The TEAC Unit features an estimated 8000 power-on-hours mean time between failure (that's 8 hours a day, 5 days a week, for 3.85 years!!). Our drives also feature a lead screw head positioner-not a band type positioner. This type of positioner insures accurate head positioning over the read-write media while giving a very quiet, noise-free read-write operation. If you have any doubts about our drives, our one year warranty should convince you that we know this unit is the best drive at the best price on the American market. This is one example where you can pay less and get more!!

$250

COMPLETE DRIVE
WITH POWER SUPPLY

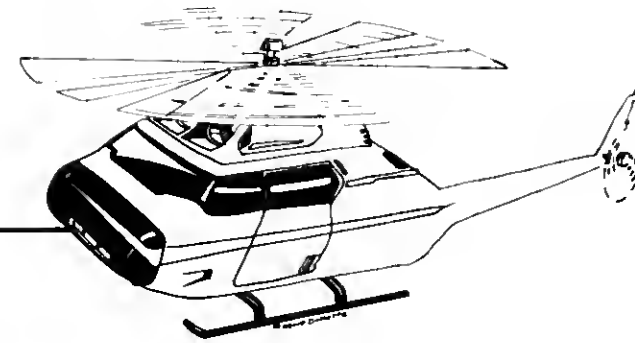
40 TRACK SINGLE SIDE	$250
40 TRACK DOUBLE SIDE	$340
80 TRACK SINGLE SIDE	$340
80 TRACK DOUBLE SIDE	$475
VERBATIM DISKETTES	$29.95
2-DRIVE CABLE	$29.95
4-DRIVE CABLE	$39.95

WE STOCK DISK DRIVES!

918-825-4844

-218

LOAD 80



Your mission: search and destroy.

Subs 'n Choppers

Charles and Glenn Gillen
American Embassy, Seoul
APO San Francisco 96301

A single helicopter patrols a lonely, distant quadrant of the see. A periscope breaks the surface, then disappears in a froth of bubbles. The chopper darts to the attack.

The periscope reappears. The pilot climbs, hovers over his target, and fires, sending a bomb hurtling down. Missed. As the sub begins to move, the pilot corrects his aim. His next bomb narrowly misses the periscope. The sub retaliates: a sea-to-air missile (SAM) climbs toward the chopper and explodes. Shaken, the pilot knows his chopper will not survive another close hit. He squints and tries to send his next bomb right on the periscope.

Thus begins this real-time animated game pitting a lone helicopter against a pack of submarines. Do not dismiss the reference to the pilot's joystick as a flight of fancy—you actually fly this chopper with the Alpha Product Company's Stick 80 joystick. Without any changes, the program works just as well with the arrow keys. A machine-language sound routine is tucked away in reserved RAM and needs no memory size setting.

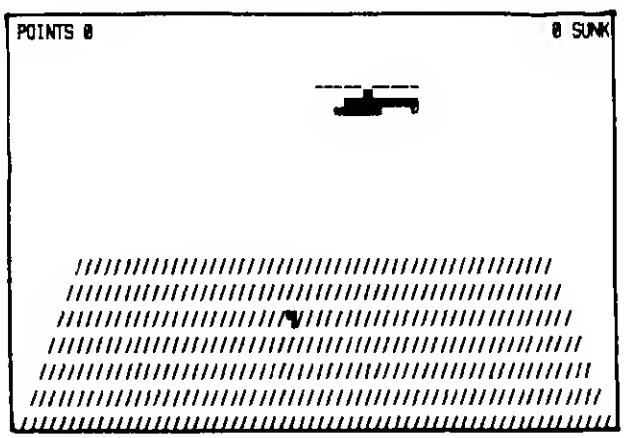


Fig. 1. Game begins with chopper hovering above sub's periscope

E$	Used to erase chopper
F$	Graphic front view of chopper
HH$	Prints F$, L$ or R$ graphics
L$	Graphic chopper going left
R$	Graphic chopper going right
SB$	Graphic sub in profile
S1$	Graphic tail of sinking sub
S2$	Graphic body of sinking sub
T$	Graphic chopper rotor
TI$	Program title
X1$	Top line of graphic blast
X2$	Middle line of blast
X3$	Bottom line of blast

Table 1. String Variables

Rules and Scoring

Position yourself over the sub, drop your bomb and cross your fingers. The sub moves a bit after each attack, disappearing if you fail to nail it after five bombs. Another will pop up and you will have to grab your joystick and take after it anew. The subs are not defenseless—a near miss persuades the sub captain to fire a SAM. His second missile will get you. I guarantee it.

Besides earning a brush with destruction, each near miss gets you 30 points. If you hit the sub squarely, it will up-end and sink as you chelk up 100 points. Your

Program Listing 1

```
0 '        Listing Number ONE    ( Vertical bombs & SAMs )
1 '
10 '       ************************      CHARLES E. GILLEN
20 '       **  SUBS 'N CHOPPERS  **      AMERICAN  EMBASSY
30 '       **    28 NOV, 1981    **      APO SAN FRANCISCO
40 '       ************************          96301
50 '       ALL REMS CAN BE DELETED.
60 '
'- - - - - - - MACHINE LANGUAGE SOUND ROUTINE BELOW BASIC RAM:
70 CLS :POKE 16527, 64 :POKE 16526, 62 ' USR ADDRESS 16446
80 FOR A = 16446 TO 16474 :READ D :POKE A, D :NEXT ' POKE SOUND
90 DATA 205, 127, 10, 62, 1, 14, 8, 237, 91, 61, 64, 69, 47
100 DATA 230, 3, 179, 211, 255, 13, 40, 4, 16, 246, 24, 242
110 DATA 37, 32, 241, 201
120 '
'- - - - - - - - - - - - - - - - - - - - - - - - - - - - INITIALIZATION:
130 CLEAR300 :DEFINT A - Z :RANDOM
140 POKE 16396, 165 ' DISABLE <BREAK>.  SHIFT+<BREAK> IS OK.
150 TITLE$ = "S U B S   'N   C H O P P E R S"
160 '
'- - - - - - - - - - -GRAPHIC STRINGS FOR 3 VIEWS OF CHOPPER:
170 T$ = STRING$(5,95) + CHR$(176) + STRING$(5,95) + CHR$(26) ' TOP LINE OF
 CHOPPER
180 L$ = T$ + STRING$(9,8) + CHR$(144) + STRING$(4,143) + STRING$(3,131) +
"8" ' CHOPPER GOING LEFT
```

Program Listing 1 Continues

The Key Box

Basic Level II
Model I
16K RAM

AMERICAN Small Business COMPUTERS

118 SO. MILL ST
PRYOR, OK 74361
(918) 825-4844

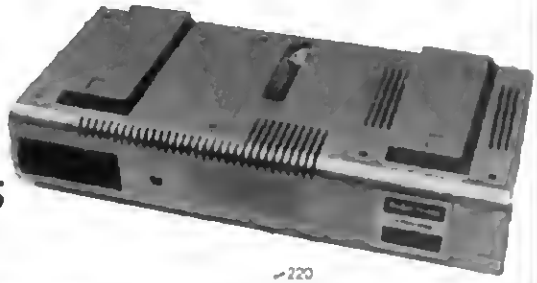
ALL PRICES ARE CASH DISCOUNTED 3% C.O.D. AND CHANGE ORDERS ARE 3% MORE
RETAIL LOCATION 447 S. WOOD, PRYOR OKLAHOMA 74361

32K EXPANSION INTERFACES

These Expansion Interfaces are Brand New, with original documentation and in perfect working condition.

Notice: These prices are good only through June 1, 1982. After June 1, 1982, the price will be $399.00

$329.95



220

CAMEO HARD DISK DRIVES FOR TRS-80 MODEL II

The Cameo Hard Disk offers TRS-80 Model II users 10 million bytes of on-line disk storage. Five million bytes are stored on a standard non-removable disk platter. The second five million bytes are stored on a removable "disk pack". This configuration allows, for example, the accounts receivable to be stored on one disk pack, accounts payable on still another disk pack, mailing list on another, etc., etc.

The Cameo also allows up to four computers to share the same disk drive. This means one person working at one computer can be updating accounts payable, while another person working at another computer can be retrieving records from a data base. So, when your business needs soar beyond a floppy disk limitations, call AMERICAN SMALL BUSINESS COMPUTERS and ask for THE CAMEO CONNECTION.

CALL FOR PRICING INFORMATION

* Dealers needed for all Cameo Hard Disk Products *

221

TRS-80® Daisy Wheel Printer II

By Radio Shack

Yes, this is the same Daisy Wheel sold by Radio Shack for a couple of hundred bucks more. This is just one more reason why it really pays to shop American Small Business Computers.

$1649.95

918-825-4844

TRS-80 PRINTERS

Line Printer V	$1635
Line Printer VI	$1020
Line Printer VII	$325
Line Printer VIII	$619

222

SOFTWARE
FOR YOUR 16K TRS-80 COLOR, MODEL I, III

NOW YOUR COMPUTER CAN ACT LIKE A COMPUTER SHOULD!!! WITH OUR MAGNETIC MAGAZINES, YOUR MICRO WILL ENTERTAIN, EDUCATE, AND CHALLENGE YOU.

TRC™

On cassette or diskette*, you will receive 6-10 programs every month ranging from games, home entertainment, and personal finance, to more of our unique "teaching" programs.
Our next issue will include:

1. **HOME INVENTORY**
2. **Reversi Board Game with Graphics**
3. **Generating Music and Sound Effects**
4. **Machine Language Programming (I)**
5. **Utility of the Month (II)**

You've already missed Stock Market Analysis, Concentration, Checkers, Golf, Algebra and Geometry Tests and Football.☆ Later issues will include Backgammon, Chess, all Tax Schedules, Baseball, and many more. So don't let another issue pass you by! Subscription price for cassette is $50 per year, $30 per ½ year and $10 for a trial issue; for diskette $75 per year, $45 per ½ year, and $15 for a trial issue.
☆(Back issues available on request)

THE COLOR ACCOUNTANT

With our complete home accounting system, keeping track of your finances can be as easy as PI.

1. **Chart of Accounts Maintenance**
2. **Complete Checkbook Maintenance**
3. **Tax Deduction Flags**
4. **Net Worth Statement**
5. **Income Less Expense Statement**
6. **Complete Graph Package** (graphs any files)
7. **Payments and Appointments Calendar**
8. **Home Budget Analysis**
9. **Mailing List**
10. **Schedule 1040 (Long Form)**
11. **Decision Maker**
12. **Schedule G (Income Averaging)**

All programs are menu-driven and allow add/change/delete. Also, all files and statements can be listed to screen or printer, and saved to cassette or diskette. The cost of THE COLOR ACCOUNTANT is $75 for cassette and $80 for diskette. This package requires 16K. THE COLOR ACCOUNTANT also comes with 40 pages of documentation.

the programmer's program

Do you know all the innovative ways of using BASIC commands? The staff at the Programmer's Institute have designed a set of programs explaining everything the manuals omit.
The Programmer's Program leads you step by step through the fundamentals of programming your computer. Then you explore the finer points...multiple loops, arrays, stacks, game programming, sorts, trees, boolean logic, and memory savers. All these methods make your programming tasks easier and more efficient. Difficult (and very useful) programs are created before your eyes, and designed so you learn at your own speed! The Programmer's Program is a must for every owner of a microcomputer.
($50 cassette, $65 diskette).

Order both The Programmer's Program and 1 year's subscription, and the total cost is only $75 cassette, $100 diskette. If you order now, you will receive a Football Program and Computerized Telephone Directory ABSOLUTELY FREE with any $75 order. So don't wait . . . order today!

THE PROGRAMMER'S INSTITUTE

A Peterborough Company
P.O. Box 3191 Dept. B
Chapel Hill, N.C. 27514
(919) 489-2198 MC & Visa Welcome

Name _____
Address _____
City/St. _____

☐ Programmer's Program ☐ Year Subscription
☐ Color Accountant ☐ ½ Year Subscription
Type of Computer: ☐ Trial Issue
_____ ☐ Cassette ☐ Diskette

TRS-80 is a trademark of the Tandy Corp. The Programmer's Program, TRC, and The Color Accountant are trademarks of the Programmer's Institute.

* All software available on cassette for MODEL I, III, COLOR. On diskette for MODEL III. ↙245

Program Listing 1 Continued

```
100 R$ = T$ + STRING$(11,8) + "8" + STRING$(3,131) + STRING$(6,163) + CHR$(
140) ' CHOPPER GOING RIGHT
200 F$ = T$ + STRING$(7,8) + CHR$(162) + CHR$(143) + CHR$(161) ' CHOPPER GO
ING UP/DOWN
210 E$ = CHR$(203) + CHR$(26) + STRING$(11,8) + CHR$(203) ' THIS ERASES THE
 CHOPPER
220 '
- - - - - - - - - - - - - - - - - - - - - - - - -SUB GRAPHICS:
230 S1$ = CHR$(130) + CHR$(185) + CHR$(167) ' SUB FINS
240 S2$ = CHR$(186) + STRING$(2, 191) ' SUB BODY
250 S3$ = STRING$(3,176) + CHR$(190) + CHR$(166) + STRING$(6,176) ' SUB PRO
FILE
260 '
- - - - - - - - - - - - - - - - - - - -BLAST CHOPPER GRAPHIC:
270 X1$ = CHR$(131) + CHR$(160) + CHR$(175) + CHR$(160) + CHR$(131) + CHR$(
160) + CHR$(176) + CHR$(160) + CHR$(131) + " "
280 X2$ = CHR$(160) + CHR$(175) + "     " + CHR$(175) + CHR$(160)
290 X3$ = CHR$(176) + CHR$(160) + CHR$(131) + CHR$(160) + CHR$(176) + CHR$(
160) + CHR$(131) + CHR$(160) + CHR$(176)
300 '
- - - - - - - - - - - - - - - - GET TITLE AND SET UP GAME DISPLAY:
310 SB = 135 :HH$ = L$ :M = 30 :L = 6 ' FIRST CHOPPER POSITION
320 GOSUB 1490 ' GET TITLE
330 GOSUB 800 ' SOME WAVES
340 JJ = L * 64 + M ' CALCULATE CHOPPER PRINT POSITION
350 PRINT @ JJ, HH$; :GOSUB 850 ' GET CHOPPER AND SUB
360 '
- - - - - - - - - - - - - - - - - - - - -TOP OF PLAYER INPUT LOOP:
370 PRINT @ 0, "POINTS" PT; :PRINT @ 55, WI "HOME";
380 IF B < 1 THEN GOSUB 850:GOTO 370 ' NO BOMBS, GET NEW SUB
390 IF PT > 599 THEN 1460 ' WIN ON POINTS
400 JS = 255 - INP(0) ' POLL JOYSTICK DOWN/UP/LEFT/RIGHT/FIRE
410 KB = PEEK(14400) ' POLL KEYBOARD
420 IF JS = 1 OR KB = 8 THEN L = L + 1 :HH$ = F$ :GOTO 490
430 IF JS = 2 OR KB = 16 THEN L = L - 1 :HH$ = F$ :GOTO 490
440 IF JS = 4 OR KB = 32 THEN M = M - RND(6) :HH$ = L$ :GOTO 490
450 IF JS = 8 OR KB = 64 THEN M = M + RND(4) :HH$ = R$ :GOTO 490
460 IF JS = 3 OR KB = 128 THEN 590 ' DROP IT
470 IF JS = 0 OR KB = 0 THEN SX = USR(257) :M = M + RND(3) - 2 'RANDOM HOVE
R IF NO PLAYER INPUT
480 '
- - - - - - - - - - - - - - - - - - - - - - - - -DRAW CHOPPER:
490 PRINT @ JJ, E$; ' ERASE OLD CHOPPER
500 IF M <= 2 THEN M = 2 :HH$ = X$ '     SET CHOPPER LIMITS
510 IF M >= 69 THEN M = 69 :HH$ = L$ '   AND DIRECTION
520 IF L <= 0 THEN L = 0 ELSE IF L >= 6 THEN L = 6
530 JJ = L * 64 + M ' FIND PRINT @ POSITION OF CHOPPER
540 PRINT @ JJ, HH$; ' PRINT CHOPPER
550 SH=USR(276) ' CLICK
560 IF HV = 1 THEN RETURN ' IF IN VENTICAL HOVER MODE
570 GOTO 370 ' CHECK INPUT LOOP AGAIN
580 '
- - - - - - - - - - - - - - - - - - - - - - - - - - - DROP THE BOMB:
590 B = B -1 :A1 = JJ + 133 ' POINT OF BOMB RELEASE
600 A2 = A1 + ( -L * 2 + 13 ) * 64 ' BOMB IMPACT POINT
610 FOR X = A1 TO A2 STEP 64 ' PATH OF BOMB
620     PRINT @ X, CHR$(160); ' BOMB
630     SE = USR(200 + X)
640     IF X > 576 THEN PRINT @ X, "/"; ELSE PRINT @ X, " " ; ' ERASE BOMB
650 NEXT ' DROP BOMB ONE MORE LINE
660 PRINT @ A2, " * "; ' MARK IMPACT SPLASH
670 FOR TO = 1 TO L :SH = USR(A2 * 3) :NEXT ' SPLASH SOUND
680 PRINT @ A2, "/"; ' FILL IN WATER
690 IF A2 = SP THEN PT = PT + 100 :WIN = WI + 1 :GOSUB 1470:GOTO1200 ' DIRE
CT HIT
700 IF A2 = SP + 1 OR A2 = SP - 1 THEN PT = PE + 30 :GOSUB 1470:GOSUB 1050
' NEAR MISS = 1 SPOT AWAY
710 GOSUB 800 ' REDRAW SEA
720 '
- - - - - - - - - - - - - - - - - - - - - - - - MOVE SUB IF NEAR MISS:
730 IF HH$ = L$ THEN SP = SP + RND(2) :SH = 135 :GOTO 770
740 IF HH$ = R$ THEN SP = SP - RND(2) :SH = 139 :GOTO 770
750 IF HH$ = F$ THEN SP = SP + 64
760 IF SP > 1000 THEN SP = SP - 128 ' STAY ON SCREEN
770 PRINT $ SP - 2, "//" CHR$(SH) "//"; ' PRINT SUB
780 GOTO 370 ' BACK TO INPUT LOOP
790 '
- - - - - - - - - - - - - - - - - - - - - - - - - - - PAINT THE SEA:
800 PRINT @ 576, ; ' START PRINTING HERE
810 FOR X = 0 TO 1 STEP -1
820     PRINT STRING$(X,32) STRING$(62 - X * 2, "/") STRING$(X,32)
830 NEXT :PRINT STRING$(62,"/"); :RETURN
840 '
- - - - - - - - - - - - - - - - - - - - - - - - - - - GET NEW SUB:
850 SX = 10 + RND(43) ' HORIZONTAL LOCATION OF SUB
860 GOSUB 800 ' GET SEA
870 ST = 8 + RND(7)    ' VENTICAL LOCATION OF SUB
880 GOSUB 600
890 SP = SX + ST * 64 ' SUB PRINT POSITION
900 HV = 1 ' TURN ON VENT HOVER
910 FOR TO = 1 TO 4  ' DELAY A BIT WITH SOUND
920     GOSUB 800
930     SE = USR(257)
940     L = L + RND(3) -2 ' SEND VENT HOVER
950     GOSUB 490 ' DRAW CHOPPER
960     POR DT = 1 TO 60 :NEXT
970 NEXT :HV = 0 ' SWITCH OFF VENTICAL HOVER
980 '
- - - - - - - - - - - - - - - - - - - -ANIMATE THE SUB POPPING UP:
990 PRINT @ SP, CHR$(148); :SE = USR(9999) :FOR TO = 1 TO 200 :NEXT
1000 PRINT @ SP, CHR$(135); :HE = USR(8886) :FOR TO = 1 TO 200 :NEXT
1010 PRINT @ SP, CHR$(139); :SE = USR(3333) :FOR TO = 1 TO 200 :NEXT
1020 PT = 0 :B = 5 ' ZERO THE PAST HITS, RELOAD 5 BOMBS
1030 RETURN
1040 '
- - - - - - - - - - - - - - - - - - - - - - - - - - -SUB FIRES BACK:
1050 FOR X = SP TO JJ + 64 STEP -64
1060     PRINT $ X, CHR$(145); ' SEA TO AIR MISSILE
1070     SE = USR(200 + X)
1080     IF X > 576 THEN PRINT @ X, "/"; ELSE PRINT @ X, " ";
1090 NEXT
1100 PRINT $ SP, CHR$(58)"///"; ' DRAW SUB AGAIN
1110 FOR SS = 1 TO 3
1120     FOR TO = 1 TO 5 :SE = USR(586) :NEXT ' CLOSE BLAST
```

Program Listing 1 Continues

AMERICAN Small Business COMPUTERS

118 SO. MILL ST
PRYOR, OK 74361
(918) 825-4844

ALL PRICES ARE CASH DISCOUNTED 3% C.O.D. AND CHARGE ORDERS ARE 3% MORE.
RETAIL LOCATION: 447 S. WOOD, PRYOR, OKLAHOMA 74361

DISCOUNT SOFTWARE FOR THE TRS-80

FARM & RANCH MANAGEMENT PROGRAMS

BEEF PROJECTION—This program simulates feeding situations for beef cattle. $20.00
BEEF RATION—This program evaluates energy, protein, calcium, and phosphorus content of ration specified by the user. $15.00
DAIRY COW—This ration evaluator computes the daily requirements for specified cow weight, milk production, and butterfat content. $15.00
FEED LOT—This pen record tracks each pen of cattle on costs accumulated. It prints a status report on any pen, and a close-out when all costs and income have been entered. $35.00 (Models I and III), $100.00 (Model II)
FARM RECORD—This program is a general farm bookkeeping program. It is capable of 52 income and 47 expense categories with inventories, net worth, 9 employee payrolls, 9 external accounts payable/receivable, 5 bank accounts, and 5 enterprises. $35.00
GOVERNMENT PROGRAM—This program compares participation with non-participation in wheat/feed grain-cotton programs under various assumptions about yields, production costs, and market prices. $15.00
GRAIN STORAGE—This program computes the cost per bushel for on-farm storage, interest, shrink and miscellaneous costs for on-farm or commercial storage for 8 time periods. $15.00
LOAN—This program computes either interest rate, payment amount, amount of loan, or years of loan when the other three variables and number of payments per year are entered. $15.00
MACHINE COST—This program calculates the average annual depreciation, interest, repairs, fuel and labor costs per hour and per acre, for machines or vehicles, for each year of ownership. $20.00
RECORD MANAGEMENT—This is a general purpose program for entering, correcting, sorting, or searching data files such as cow records, field records for crops, machinery parts lists, mailing lists, etc. $15.00
ESTATE TAX—This program prints anticipated Oklahoma and Federal taxes for specified families at individual spouse. It allows for the testing of various distribution strategies. $25.00
FEED FORMULATOR—The Feed Formulator calculates the least-cost ration for up to 20 nutritional constraints and up to 30 ingredients. $30.00
PASTURE PROJECTION—This program projects gains and income expense from pasture for beef cattle. $20.00

HARDWARE REQUIREMENTS FOR THE ABOVE PROGRAMS (MINIMUM) TRS-80 Model I or III with 48K and one disk drive. For Model II Versions of the above programs, please add $5.00 per program (Feed Lot Program Add $65). Buy all the above programs and save even more. Model I and III Versions only $250.00 (Save $30). Model II Versions Only $350 (Save $55).

RADIO SHACK SOFTWARE MOD I, III

PROFILE	$69.95
PROFILE III PLUS	$175.00
VISICALE	$87.95
VISICALE III	$175.00
SCRIPSIT	$87.95
SUPER SCRIPSIT	$175.00
SCRIPSIT DICTIONARY	$131.00

MICROSOFT

ADVENTURE	$23.00
OLYMPIC DECATHALON	$24.95

NEW DOS/80 2.0 OR DOS PLUS 3.4 YOUR CHOICE, ONLY $139

DOS PLUS 3.4 and NEWDOS/80 2.0 are two of the most advanced operating systems ever available for the TRS-80. After spending thousands of dollars on your computer, why limit yourself by using an inferior operating system? Order Today!!

BIG FIVE

- Supernova
- Attack Force
- Cosmic Fighter
- Meteor Mission
- Defense Command

$18.95 — Disk
$12.95 — Cassetta

CALL 918-825-4844

DEALER INQUIRIES INVITED

223

★ ATTENTION SOFTWARE AUTHORS ★

American Small Business Computers is one of the nation's largest suppliers and distributors of TRS-80 related software. If you have a program which you would like to market, please contact Ms. Jeanie Phillips at American Small Business Computers. She will test and evaluate each program received. If the program meets our high standards, an offer of acceptance, along with our terms, will be returned with the software. All types of games, business and scientific programs will be considered. Highest royalties are now being paid for Color Computer programs.

Program Listing 1 Continued

```
1130 NEXT :GOSUB 1420 ' BLANK THE SKY
1140 PRINT @ JJ, X1$; :PRINT @ JJ + 64, X3$; :FOR TO = 1 TO 300 :NEXT
1150 GOSUB 1420
1160 BT = BT + 1 :IF BT < 2 THEN PRINT @ JJ, BB$; :RETURN ' ON SECOND HIT,
KILL CHOPPER:
1170 '
- - - - - - - - - - - - - - - - - - - - - - - - -KILL THE CHOPPER:
1180 PRINT @ JJ + 64, X3$; ' BOTTOM LINE OF BLAST
1190 PRINT @ JJ, X2$; ' MIDDLE OF BLAST
1200 IF JJ > 64  THEN PRINT @ JJ - 64, X1$; ' TOP OF BLAST
1210 FOR TO = 1 TO 150 :SE = USR(586) :NEXT
1220 GOSUB 1420 ' BLANK SKY
1230 PRINT @ 276,"THE SUB WON THIS TIME";
1240 PRINT @ SP - 64, CHR$(176); :PRINT @ SP - 3, SB$; '
1250 FOR TO = 1 TO 2000 :NEXT
1260 CLS :WI = 0 :PT = 0 :GOTO 330 ' ZERO SCORE AND TRY AGAIN
1270 '
- - - - - - - - - - - - - - - - - - - - - - - - -SINK THE SUB:
1280 GOSUB 800 ' GET SEA
1290 PRINT @ SP - 65, S1$; :PRINT @ SP - 1, S2$; ' SINK SUB
1300 FOR SG = 3333 TO 3680 STEP 30 :SE = USR(SG) :NEXT ' SINK GURGLE
1310 PRINT @ SP - 1, S1$; ' THERE SHE GOES
1320 IF SP > 640 THEN PRINT @ SP - 65, "///"; ELSE PRINT @ SP - 65, "   ";
1330 FOR TO = 1 TO 500 : NEXT ' REST IN PEACE
1340 FOR TO = 1 TO 3
1350     GOSUB 800 ' RIPPLE THE SEA
1360 NEXT
1370 IF WI > 4 THEN 1660 ' VICTORY
1380 PRINT @ SP - 1, "///";
1390 GOSUB 650 ' GET NEW SUB
1400 GOTO 370 ' BEGIN CONTROL LOOP
1410 '
- - - - - - - - - - - - - - - - - - - - - - - - - ERASE THE SKY:
1420 PRINT @ 0, ; ' BEGIN BLANKING HERE
1430 FOR TO = 1 TO 9
1440     PRINT CHR$(254);
1450 NEXT :RETURN
1460 '
- - - - - - - - - - - - - - - - - - - - - - - - -UPDATE SCORE:
1470 PRINT @ 0, "POINTS" PT; :PRINT @ 55, WI "SUNK"; :RETURN
1480 '
- - - - - - - - - - - - - - - - - - - - - - - - - TITLE:
1490 GOSUB 800 ' GET SEA
1500 PRINT @ 16, TITLE$
1510 GOSUB 650 ' GET SUB
1520 FOR SG = 3333 TO 3680 STEP 20
1530     PRINT @ SP + RND(3) - 2, "O"; ' BUBBLES
1540     SE = USR(SG) ' GURGLE
1550 NEXT
1560 CLS :PRINT @ 16, TITLE$
1570 PRINT @ 192, "STICK IT TO THE    " SB$
```

Program Listing 1 Continues

tour of sub-patrol duty ends if you sink five subs (or earn 600 points) before getting blasted out of the sky. If you do get hit by a sub's second SAM missile, the sub will surface to mock you and the game begins anew.

Winning depends on your reflexes and good aim. There is some random action in the program, but only to simulate the chopper's hovering against the chill sea wind, and to control the position and movements of the target sub.

Almost 3-D

The game's genesis was an attempt at portraying three-dimensional action on the TRS-80 video screen. The quadrant of sea you patrol seems to recede toward the horizon. You can fly left or right, and into or out of the screen. The forward joystick or the up arrow moves your chopper in (down) toward the horizon. Try to imagine your controls moving the chopper in an X-Y plane over the sea, rather than changing its altitude. The

• • • STRAIGHT TALK FROM THE SUPPLY SIDE • • •

What makes a person spend his hard earned money for a product with a mail order company? Is it an ad that looks like a 1950's Juke Box? Is it an ad that says that you will get top quality merchandise at a price far below it's market value? Operating a major computer center repair facility is an enlightning experience, most every day we see some poor soul who has bought a poorly designed, poorly built product that won't work, and can't be repaired because the manufacturer has obliterated it's chip numbers and refuses to provide schematics for the circuits. His frustration is even worse when it's a kit with bad or incomplete instructions, bad components, or is totaly incompatible with his standard machine. Perhaps it can be said, they got what they paid for.

The companies described above could not exist if someone did not buy their products, true they don't get such repeat business, but the old addage, "you can fool all of the people some of the time", still serves them well.

We at LEVEL IV are somewhat "old fashioned", we feel that our long term interests are best served with a few simple policies!

ææææ if we can't service it we don't sell it,
ææææ if we can't provide the schematics (on request) we don't sell it,
ææææ if it's not reasonably priced we don't sell it,
ææææ if it's not 1st quality we don't sell it,
ææææ if it's not compatible with the standard we don't sell it,
ææææ if you are not pleased give us a call we'll sure try to work out the problem,

Some of the well known names in the industry have substandard products widely advertised as well, one in particular has a MOD-III 1st drive kit at an unbelieveable price, unbelieveable until you try to add the 2nd drive, the power supply will only handle one, and all your cables must be scrapped! The 2nd drive costs almost as much as the 1st! Perhaps if we named them they would "clean up their act"!

We'll continue our battle to clean up the industry another time, I'm afraid the advice, "let the buyer beware" still has merit, now back to work, it's time to sell somethin'.

• • • A FEW SAMPLES OF OUR PRICES! (we carry over 900 hardware and software items if you don't see the one you need, give us a call)

ææææ MOD-III 48k with (2) Tandon or M.P.I. drives	$1749.00
ææææ Disk drives (add-on or add-in) Tandon or M.P.I. from just	$ 199.00
ææææ Winchester drives complete with 8DS, 6.4 meg, just plug it in	$1990.00
ææææ Winchester drives complete with DDS, 14.5 meg, just plug it in	$2395.00
ææææ Computer power linefilter, 15amp, 6 outlets, switch & indicator lite	$ 39.95
ææææ Printer switch, connect (2) printers to computer, switch between them	$ 79.95
ææææ Epson printers, all models,	$ call
ææææ Color computer RS232 Port Expander, add 2 or 3 switch selectable ports	$ 39.95
ææææ Color computer 1st drive assembly complete	$ 439.00
ææææ Color computer 16k with extended basic	$ 449.00
ææææ Color computer 64k with extended basic	$ 660.00

LEVEL IV PRODUCTS, INC.

32629 SCHOOLCRAFT ROAD
LIVONIA, MICHIGAN 48150
(313) 525-4580

TOLL FREE ORDER HOT LINE
800-521-3305

Your One Stop Computer Shopping Center

chopper, however, does not get smaller as it nears the horizon. I admit the three-dimensional idea is still largely in the imagination.

The Programs

Subs 'n Choppers is presented here in two forms with slightly different action. Program Listing 1 consists mostly of single statement lines, with abundant remarks. Besides making the program easier to understand, the extra spaces make it easier to type without mistakes. The Listing 1 version drops the bombs straight down, and launches the sub's SAMs vertically.

Program Listing 2 is the same program boiled down to a minimum of memory space. No features were sacrificed in the process. In fact, the game is a bit harder because the bombs fall in a slant trajectory. SAMs fired by the sub climb at an angle, adding a bit more realism. Listing 2 required limiting the chopper's flight path to prevent dropping bombs off the screen. The speed of the two listings is essentially the same. The short listing's only savings are reduced CLOAD time and RAM storage.

The variables used are listed in Tables 1 and 2. The improved action in Listing 2 requires only one new variable, PB, to angle the path of the bomb left or right depending on the chopper's direction. ■

A1	Chopper's bomb release point
A2	Bomb impact point
B	Number of bombs
DT	Counter or time delay
HV	Switch for random hover
JJ	Position to print chopper
JS	Joystick input
KB	PEEK keyboard arrow keys
L	Line chopper is located
M	Chopper position on line L
PB	Bomb drop angle (Listing 2 only)
PT	Points scored
SB	CHR$ code for periscope
SE	Sound effect USR call
SG	Sound effect USR call
SP	Sub print location
SX	Sub's horizontal position
SY	Sub's vertical position
TO	Counter or time delay
WI	Number of subs sunk
X	Counter
Z	Counter

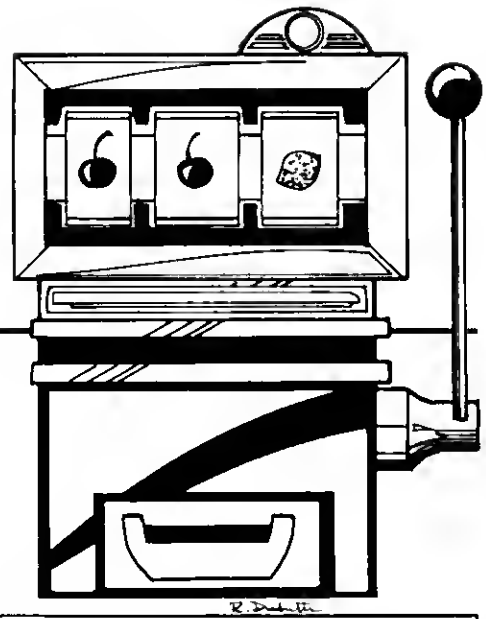
Table 2. Numeric Variables

Program Listing 1 Continued

```
158@ PRINT :PRINT "WITH YOUR 'STICK 8@' JOYSTICK
159@ PRINT "MADE BY THE ALPHA PRODUCT COMPANY" :PRINT TAB(5@) L$
16@@ PRINT @ 512, "OR USE THE PLAIN OLD ARROW KEYS AND SPACEBAR
161@ PRINT :PRINT "FOR SOUND, PLUG THE AUX CABLE
162@ PRINT "INTO A SMALL AMPLIFIER" :PRINT :PRINT TAB(11) S1$
163@ PRINT "SINK FIVE  "S2$"  (OR GAIN 6@@ POINTS) TO WIN THE GAME";
164@ FOR TD = 1 TO 55 :SE=USR(276) :FOR DT = 1 TO 17@ :NEXT :NEXTTD :CLS :R
ETURN
165@ '
- - - - - - - - - - - - - - - - - - - - - - - - - -VICTORY ENDING:
166@ CLS :PRINT @ 8@, TITLE$
167@ GOSUB 8@@ ' GET SEA
168@ PRINT @ 199,L$ "  YOU SANK"WI"SUBMARINES
169@ PRINT @ 4@4, "AND SCORED"PT"POINTS  "R$
17@@ PRINT @ 715, , :FOR X = 1 TO WI ' @ OF SUNK SUBS TO PRINT
171@     PRINT S1$ "//////";
172@ NEXT
173@ PRINT @ 779, ;
174@ FOR X = 1 TO WI
175@     PRINT S2$ "//////";
176@ NEXT :PRINT @ 97@, " < ENTER > FOR NEW GAME ";
177@ IF INKEY$ <> CHR$(13) THEN SE = USR(257@) :GOTO 177@
178@ WI = @ :PT = @ ' ZERO THE SCORES
179@ CLS :GOTO 34@ ' START OVER
```

```
@ '
Listing Number TWO  ( Diagonal bombs & SAMs )
1 '
1@ '      ************************     CHARLES E. GILLEN
2@ '      **  SUBS 'N CHOPPERS  **     AMERICAN  EMBASSY
3@ '      **    29 NOV, 1981    **     APO SAN FRANCISCO
4@ '      ************************          963@1
5@ '
7@ CLS:POKE16527,64:POKE16526,62:FORX=16446TO16474:READD:POKEX,D:NEXT:DATA2
85,127,1@,62,1,14,@,237,91,61,6@,69,47,23@,3,179,211,255,13,4@,4,16,246,24,
242,37,32,241,2@1:CLEAR3@@:DEFINTA-Z:RANDOM:POKE16396,165:TI$="S U B S   'N
   C H O P P E R S"
17@ T$=STRING$(5,95)+CHR$(176)+STRING$(5,95)+CHR$(26):L$=T$+STRING$(9,8)+CH
R$(14@)+STRING$(4,143)+STRING$(3,131)+"@":R$=T$+STRING$(11,8)+"@"+STRING$(3
,131)+STRING$(4,143)+CHR$(14@):F$=T$+STRING$(7,8)+CHR$(142)+CHR$(142)+CHR$(
141)
21@ E$=CHR$(2@3)+CHR$(26)+STRING$(11,8)+CHR$(2@3):S1$=CHR$(13@)+CHR$(185)+C
HR$(147):S2$=CHR$(186)+STRING$(2,191):SB$=STRING$(3,176)+CHR$(19@)+CHR$(18@
)+STRING$(4,176)
27@ X1$=CHR$(131)+CHR$(14@)+CHR$(176)+CHR$(14@)+CHR$(131)+CHR$(14@)+CHR$(17
6)+CHR$(14@)+CHR$(131)+"  ";X2$=CHR$(14@)+CHR$(179)+"      "+CRR$(179)+CHR$(1
4@)
29@ X3$=CHR$(176)+CHR$(14@)+CHR$(131)+CHR$(14@)+CHR$(176)+CHR$(14@)+CHR$(13
1)+CHR$(14@)+CHR$(176):SB=135:HH$=LS:N=3@:L=4:PB=63:GOSUB146@
33@ GOSUB8@@:JJ=L*64+N:PRINT@JJ,HH$;:GOSUB85@
37@ PRINT@@,"POINTS"PT;:PRINT@55,WI"SUNK";:IFB<1THERGOSUB85@:GOTO37@ELSEIFP
T>599THEN166@ELSEJS=255-INP(@):XB=PEEK(14400)
42@ IFJS=1ORXB=8THENL=L+1:HB$=F$:PB=64:GOTO49@ELSEIFJS=2ORXB=16THENL=L-1:HH
$=FS:PB=64:GOTO49@ELSEIFJS=4ORXB=32THENN=N-RND(4):HH$=L$:PB=63:GOTO49@ELSEI
FJS=8ORXB=64THENN=N+RND(4):HN$=R$:PB=65:GOTO49@ELSEIFJS=3ORXB=128THEN59@
47@ IFJS=@ORXB=@THENSE=USR(257):N=N+RND(3)-2
49@ PRINT@JJ,E$;:IFN<=@THENM=@:HH$=R$:PB=65ELSEIFM>=43THENM=43:HH$=L$:PB=63

52@ IFL<=@THENL=BELSEIFL>=6THENL=6
53@ JJ=L*64+N:PRINT@JJ,HH$;:SE=USR(276):IFHV=1THENRETURNELSE37@
59@ B=B-1:A1=JJ+133:A2=A1+(-L*2+13)*PB:FORI=A1TOA2STEPPB:PRINT@I,CHR$(14@);
:SE=USR(2@@+I):IFI>576THENPRINT@I,"/";ELSEPRINT@I," ";
65@ NEXT:PRINT@A2," " ;:FORTD=1TOL:SE=USR(A2*3):NEXT:PRINT@A2,"///";:IFA2=
SPTHENPT=PT+1@@:WI=WI+1:GOSUB147@:GOTO128@ELSEIFA2=SP+1ORX2=SP-1THENPT=PT+3
@:GOSUB147@:GOSUB1@5@:GOSUB8@@
73@ IFHH$=L$THENSP=SP+RND(2):SB=135:GOTO77@ELSEIFHH$=R$THENSP=SP-RND(2):SB=
139:GOTO77@ELSEIFHH$=F$THENPRINT@SP,"/";:SP=SP+64
76@ IFSP>1@@@THENSP=SP-128
77@ PRINT@SP-2,"//"CHR$(SB)"//";:GOTO37@
8@@ PRINT@576,;:FORX=6TO1STEP-1:PRINTSTRING$(X,32)STRING$(62-X*2,"/")STRING
$(X,32):NEXT:PRINTSTRING$(62,"/");:RETURN
85@ SX=14+RND(39):GOSUB8@@:SY=8+RND(7):GOSUB8@@:SP=SX+SY*64:HV=1:FORTD=1TO4
:GOSUB8@@:SE=USR(257):L=L+RND(3)-2:GOSUB49@:FORDT=1TO4@:NEXT:NEXT:HV=@
99@ PRINT@SP,CHR$(14@);:SE=USR(9999):FORTD=1TO2@@:NEXT:PRINT@SP,CHR$(135);:
SE=USR(6666):FORTO=1TO2@@:NEXT:PRINT@SP,CHR$(139);:SE=USR(3133):FORTD=1TO2@
@:NEXT:NT=@:B=5:RETURN
1@5@ FORZ=SPTOJJ+64STEP-PB:PRINT@Z,CHR$(145);:SE=USR(2@@+Z):IFZ>576THENPRIN
T@Z,"/";ELSEPRINT@Z," ";
1@9@ NEXT:PRINT@SP,CHR$(SB)"///";:FORE&-1TO3:FORTD=1TO5:SE=USR(5@6):NEXT:NE
XT:GOSUB1&2@
114@ PRINT@JJ,X1$;:PRINT@JJ+64,X3$;:FORTD=1TO3@@:NEXT:GOSUB142@:HT=NT+1:IFH
T<2THENPRINT@JJ,HH$;:RETURNELSEPRINT@JJ+64,X3$;:PRINT@JJ,X2$;:IFJJ>64THENPR
INT@JJ-64,X1$;
121@ FORTD=1TO15@:SE=USR(5@6):NEXT:GOSUB142@:PRINT@276,"THE SUB WON THIS TI
ME";:PRINT@SP-64,CHR$(176);:PRINT@SP-3,SB$;:FORTD=1TO2@@@:NEXT:CLS:WI=@:PT=
@:GOTO33@
128@ GOSUB8@@:PRINT@SP-65,S1$;:PRINT@SP-1,S2$;:FORSG=3333TO36@@STEP3@:SE=US
R(SG):NEXT:PRINT@SP-1,S1$;:IFSP>64@THENPRINT@SP-65,"///";ELSEPRINT@SP-65,"
  ";
133@ FORTD=1TO5@@:NEXT:FORTD=1TO3:GOSUB8@@:NEXT:IFWI>@THEN166@ELSEPRINT@SP-
1,"///";:GOSUB85@:GOTO37@
142@ PRINT@@,;:FORTD=1TO9:PRINTCHR$(254);:NEXT:RETURN
147@ PRINT@@,"POINTS"PT;:PRINT@55,WI"SUNK";:RETURN
149@ GOSUB8@@:PRINT@16,TI$;GOSUB85@:FORSG=333TO36@@STEP2@:PRINT@SP+RND(3)-
2,"O";:SE=USR(SG):NEXT:CLS:PRINT@16,TI$;PRINT@192,"STICK IT TO THE    "SB$;
PRINT:PRINT"WITH YOUR 'STICK 8@' JOYSTICK
159@ PRINT"MADE BY THE ALPHA PRODUCT COMPANY":PRINTTAB(5@)L$;PRINT@512,"OR
USE THE PLAIN OLD ARROW KEYS AND SPACEBAR":PRINT:PRINT"FOR SOUND, PLUG THE
AUX CABLE":PRINT"INTO A SMALL AMPLIFIER":PRINT:PRINTTAB(11)S1$
163@ PRINT"SINK FIVE  "S2$"  (OR GAIN 5@@ POINTS) TO WIN THE GAME";:FORTD=1
TO45:SE=USR(276):FORDT=1TO17@:NEXT:NEXT:CLS:RETURN
166@ CLS:PRINT8@@,TI$:GOSUB8@@:PRINT@199,L$"  YOU SANK"WI"SUBMARINES";PRINT
@4@4,"AND SCORED"PT"POINTS  "R$:PRINT@715,;:FORX=1TOWI:PRINTS1$"//////";:NE
XT:PRINT@779,;:FORX=1TOWI:PRINTS2$"//////";:NEXT:PRINT@97@," < ENTER > FOR
NEW GAME ";
177@ IFINKEY$<>CHR$(13)THENSE=USR(257@):GOTO177@ELSENI=@:PT=@:CLS:GOTO33@
```

Program Listing 2



Save your silver dollars by playing at home.

Casino Slot Machine

Ron Balewski
412 East Ridge Street
Nanticoka, PA 18634

This hybrid slot machine program uses machine languaga for graphics and Basic for sat-up, housekeeping and control functions. Program Listing 1 is tha Basic program. I apologiza for tha stranga numbaring scheme. Sections and subroutines start on avan 100 and 1000 boundaries for easy location.

The Basic Program

Linas 10-115 print instructions and call a routine to POKE tha machina language routine into high mamory. Lina 120 points to whara tha wheel imaga will start.

Tha wheel imaga consists of tha 1512 bytes of memory between 31256 and 32767. It is arranged as 126 rows of 12 bytes aach. Three rows maka up ona symbol spaca on tha wheel. I kept one blank symbol space between aach wheel symbol making a total of 21 symbols and 21 blanks on the wheel (Fig. 1). To see the wheel, type in the following after running tha program:

```
FOR K = 31256 TO 32767 STEP 12:FOR
L = 0 TO 11: PRINT CHR$
(PEEK(K + L));:NEXT L:PRINT:NEXT K
```

The Key Box

Model I
16K RAM
Casaette Basic
Editor/Aaaembler Optional

Program Listing 1. Basic

```
1 '*****************************
2 '*  THE LUCKY 7 SLOT MACBINE *
3 '*****************************
4 '             BY
5 '        RON BALEWSKI
6 '
7 '
8 '  SEPTEMaER 26, 1981
9 '
10 CLEAR150:DEFINTA-Y
15 CLS:PRINT@5,"T H E   L U C K Y   7   S L O T   M A C H I N E"
:PaINT@69,STRING$(47,"=")
20 PRINT:PRINTTAa(10)"THE FOLLOWING FUNCTIONS ARE AVAILABLE TO Y
OU:    ":PRINTTAB(10)STRING$(45,"-"):PRINT"   ";CHR$(92);"
-PUT A COIN INTO THE MACHINE
<ENTER>   -PULL THE SLOT MACHINE'S LEVER"
25 PRINT"   Q      -QUIT
30 PRINT"   M      -ADD MONEY TO YOUR POT
   P      -DISPLAY TNE PAYOFF TABLE


YOU CAN ENTER UP TO FIVE COINS PER PLAY.  IN ORDER TO WIN THE
JACKPOT, YOU MUST PLAY FIVE COINS AND GET THREE 7'S."
40 PRINT
110 PRINT@975,"JUST A MINUTE, PLEASE.";
115 GOSUa12000   ' SET UP MACHINE LANGUAGE SUaROUTINE
120 K1=31256
130 WH$="7SDSTDSTSDS7STDSDSTDS":'  WHEEL IMAGE
131 FORK=1TO21:A$=MID$(WH$,K,1):IFA$="S"THENGOSUa1000ELSEIFA$="D
"THENGOSUB2000ELSEIFA$="T"THENGOSUB3000ELSEIFA$="7"GOSUB4000ELSE
GOSUB5000:GOSUa5000
132 NEXTK:PRINT@975,"PRESS ANY KEY TO BEGIN.";
133 A$=INKEY$:IFA$=""THEN133
135 V=31166:L=16526:GOSUa9000:L=31196:V=31260:GOSUB9000:L=31190:
V=31268:GOSUa9000:L=31200:V=31268:GOSUB9000:PO=50:AT=50
136 TC=5000
137 PT(1,1)=10:PT(2,1)=15:PT(3,1)=20:PT(4,1)=40:PT(5,1)=100:'  P
AYOFF TABLE
138 FORK=2TO5:FORL=1TO5:PT(L,K)=PT(L,1)*K:NEXTL:NEKTK
139 '  ORAW WHEEL AND PRINT MESSAGES
140 CLS:FORK=15488TO16120STEP64:POKEK,191:POKEK+1,149:POKEK+14,1
70:POKEK+15,149:POKEK+20,170:POKEK+29,149:POKEK+42,170:POKEK+43,
191:NEXTK:PRINT@448,"-";CHR$(94);:PRINT@490,CHR$(93);"-";:POKE15
022,174:POKE15023,157:POKE15036,174:POKE15037,157
145 FORK=15490TO15531:POKEK,140:POKEK+640,140:NEXTK:POKE15400,10
8:POKE15489,156:POKE16120,143:POKE16129,141:POKE15530,172:POKE15
531,100:POKE16170,142:POKE16171,143:POKE15502,172:POKE15503,156:
POKE15516,172:POKE15517,156
146 POKE16142,142:POKE16143,141:POKE16156,142:POKE16157,141:PRIN
T@10,"LUCKY 7 SLOT MACHINE";:PRINT@906,"CURRENT JACKPOT:";:PRINT
@753,"COINS PLAYED";:PRINT@943,"YOUR TOTAL";
148 PRINT@45,"CURRENT OPTIONS:";
150 NC=0:PRINT@173,"DEPOSIT COIN";:JP=.3*TC:PRINT@975,JP;:PRINT@
1018,PO;:PRINT@820,NC;
160 A$=INKEY$:IFA$="Q"THENGOTO680ELSEIFA$="P"THEN700ELSEIFA$=""T
HEN160ELSEIFA$="Q"THENGOTO800ELSEIFASC(A$)=13THENGOTO10000ELSEIF
A$="M"THENGOTO900ELSEIFASC(A$)<>10THEN160
170 IFPO=0ORNC=5GOTO160ELSENC=NC+1:PO=PO-1:TC=TC+1:PRINT@1010,PO
```

Program Listing 1 Continues

FOR FAST RELIEF

Take DOSPLUS 3.4

Do you have that tired dragged out feeling known as "DOS Drag" from an operating system that is just **too** slow? Do you have "Computis Interruptous" because you spend more time with your DOS manual than you do at your computer? Has an undependable DOS got you down with the inadvertent "Dumps"?

Then you need DOSPLUS 3.4. DOSPLUS 3.4 contains all the active ingredients for a quick recovery. Dependable fast action features like instant boot-up, BASIC array sort (multi-key, multi-array), Tape/Disk-Disk/Tape utility (with program relocator), Input@ (controlled screen input from BASIC), and complete disk editing features including random access file editing and ASCII modification on sector dump utility.

And who wouldn't feel better with proven features like the ability to use a "DO" (command chaining) file from within a BASIC program, and more reliable BACKUP and FORMAT utilities.

In addition, you have the convenience of repeating the last DOS command with "/" <ENTER>, a single file convert from Model III TRSDOS, file directory supported for Model III TRSDOS disks, complete device routing supported with FORCE and JOIN, and the ability to read or create 40 track disks in 80 track drives. Plus many other time and effort saving features.

Of course, in order for a prescription to work, you've got to follow instructions — in this case the instructions are contained in the new easy to use easy to follow 240 page DOSPLUS users guide with system technical reference section. So, if you're experiencing any DOS related discomfort, get instant relief. Get DOSPLUS 3.4 **$149.95**

DOSPLUS

First in the Industry backed by a lifetime warranty.

MICRO SYSTEMS SOFTWARE, INC.
5846 Funston Street • Hollywood, FL 33023

(Outside of Fla.)
CALL TOLL FREE
1-800-327-8724

FOR VISA/MASTERCHARGE/C.O.D. ORDERS
TOLL FREE LINES WILL ACCEPT ORDERS ONLY!
For Applications and Technical Information,
Call (305) 983-3390 or drop us a card.
Dealers Inquiries Invited

384

Program Listing 1 Continued

```
;:PRINT@820,NC;:PRINT@493,"COIN ACCEPTED";:K=USR(296):K=USR(266)
:FORL=1TO30:NEXT:PRINT@493,"                ";
100 IFNC=5PRINT@173,"                ";
190 PRINT@301,"PULL ARM";
200 GOTO160
600 'CALCULATE ODDS
610 PO=PO+NC:TC=TC-NC:CS=0:CD=0:CT=0:C7=0:FORKA=1TO21:A$=MID$(WH
$,KA,1):IFA$="S"THENCS=CS+1ELSEIFA$="D"THENCD=CD+1ELSEIFA$="T"TH
ENCT=CT+1ELSEIFA$="7"THENC7=C7+1
620 NEXTKA:ZS=(CS/42)[3:ZD=(CD/42)[3:ZT=(CT/42)[3:Z7=(C7/42)[3:Z
B=((CS+CD+CT)/42)[3:ZA=ZB-ZS-ZD-ZT:ZN=(ZA*PT(1,1))+(ZS*PT(2,1))+
(ZD*PT(3,1))+(ZT*PT(4,1))+(Z7*PT(5,1))
630 CLS:PRINTTAB(13);"C A L C U L A T E D   O D D S":PRINTTAB(13
);STRING$(30,"="):PRINT:PRINTTAB(10)"SEVENS";TAB(30);"1 IN";1/Z7
:PRINTTAB(10)"TRIPLE BARS";TAB(30);"1 IN";1/ZT
640 PRINTTAB(10)"DOUBLE BARS";TAB(30)"1 IN";1/ZD:PRINTTAB(10)"SI
NGLE BARS";TAB(30)"1 IN";1/ZS:PRINTTAB(10)"ANY THREE BARS";TAB(3
0);"1 IN";1/ZA
650 PRINT:PRINT:PRINT"FAIRNESS:  ";:PRINTUSING"$0.44";ZN;:PRINT"
 RETURNED FOR EACH DOLLAR PLAYED."
660 PRINT@970,"PRESS ANY KEY TO RETURN TO GAME.";
670 A$=INKEY$:IFA$=""THEN670ELSEGOTO140
699 '  DISPLAY THE PAYOFF CHART
700 PO=PO+NC:TC=TC-NC:PT(5,5)=JP:CLS:PRINT@30,"PAYOFF CHART":PRI
NTTAB(25)"NUMBER OF COINS PLAYED":PRINTTAB(10)"1";TAB(20)"2";TAB
(30)"3";TAB(40)"4";TAB(50)"5":FORK=1TO6:PRINTSTRING$(64,140);" "
:NEXT
710 FORK=15502TO16206STEP64:POKEK,191:POKEK+10,191:POKEK+20,191:
POKEK+30,191:POKEK+40,191:POKEK+49,191:NEXTK
720 PRINT@256,"SEVENS";:PRINT@304,"TRIPLE BARS";:PRINT@512,"DOUB
LE BARS";:PRINT@640,"SINGLE BARS";:PRINT@768,"ANY THREE BARS";
730 FORK=1TO5:FORL=1TO5:PRINT@135+(128*K)+(10*L),PT(6-K,L);:NEXT
L:NEXTK
740 PRINT@980,"PRESS ANY KEY TO RETURN TO GAME";
750 A$=INKEY$:IFA$=""THEN750ELSEGOTO140
799 '  END OF GAME ANALYSIS
800 PO=PO+NC:TC=TC-NC:CLS:PRINT:PRINTTAB(10)"A N A L Y S I S:"
810 PRINT:PRINT"PERSONAL MONEY USED";TAB(20);"==>";AT;"COINS":PR
INT"MONEY LEFT IN POT";TAB(20);"==>";PO;"COINS":PRINTTAB(20)"===
=======":PRINT"NET GAIN/LOSS";TAB(20);"==>";ABS(PO-AT);"COINS ";

820 IFPO>ATPRINT"GAINED"ELSEIFPO=ATPRINT" *** EVEN ***"ELSEPRINT
"LOST"
830 PRINT:PRINT:PRINTTAB(10)"TRY YOUR LUCK AGAIN SOMETIME SOON."

840 PRINT:PRINT"ANOTHER PLAYER (Y/N)?"
850 A$=INKEY$:IFA$=""THEN850ELSEIFA$="N"THENSTOPELSEIFA$<>"Y"THE
N850
860 PO=50:AT=50:GOTO140
899 '  ADD MONEY TO POT
900 PO=PO+NC:TC=TC-NC:CLS:PRINT@266,"YOU HAVE";PO;"COINS CURRENT
LY IN YOUR POT."
910 PRINT@394,"";:INPUT"HOW MANY WOULD YOU LIKE TO ADD";AC:PO=PO
+AC:AT=AT+AC:PRINT@650,"SO FAR YOU ADDED";AT;"COINS TO YOUR POT.
":FORL=1TO300:NEXTL:GOTO140
1000 ' PUT SINGLE BAR
1010 FORL=1TO12:POKEK1,128:K1=K1+1:NEXTL:FORL=1TO12:POKEK1,191:K
1=K1+1:NEXTL:FORL=1TO12:POKEK1,128:K1=K1+1:NEXTL:GOSUB5000:RETUR
N
2000 ' DOUBLE BAR
2010 FORL=1TO12:POKEK1,180:K1=K1+1:NEXTL:FORL=1TO12:POKEK1,128:K
1=K1+1:NEXTL:FORL=1TO12:POKEK1,143:K1=K1+1:NEXTL:GOSUB5000:RETUR
N
3000 ' TRIPLE BAR
3010 FORL=1TO36:POKEK1,140:K1=K1+1:NEXTL:GOSUB5000:RETURN
4000 ' 7
4010 POKEK1,128:K1=K1+1:POKEK1,160:K1=K1+1:POKEK1,190:K1=K1+1:FO
RL=1TO4:POKEK1,143:K1=K1+1:NEXTL:POKEK1,175:K1=K1+1:POKEK1,191:K
1=K1+1:POKEK1,159:K1=K1+1:FORL=1TO6:POKEK1,128:K1=K1+1:NEXTL:POK
EK1,160:K1=K1+1:POKEK1,184:K1=K1+1:POKEK1,150:K1=K1+1
4020 POKEK1,135:K1=K1+1:POKEK1,129:K1=K1+1:FORL=1TO6:POKEK1,128:
K1=K1+1:NEXTL:POKEK1,184:K1=K1+1:POKEK1,141:K1=K1+1:POKEK1,129:K
1=K1+1:FORL=1TO6:POKEK1,128:K1=K1+1:NEXTL:GOSUB5000:RETURN
5000 ' SPACE
5010 FORL=1TO36:POKEK1,128:K1=K1+1:NEXTL:RETURN
9999 '  POKE 2-BYTE NUMBER IN V INTO LOCATION L
9000 VH=INT(V/256):VL=((V/256)-INT(V/256))*256:POKEL,VL:POKEL+1,
VH:RETURN
9999 '  RUN THE WHEEL AND CHECK FOR WINS
10000 IFNC=0GOTO150ELSEPRINT@173,"                ";:PRINT@301,"
    ";:V1=99+RND(42)*3:V2=V1+42+RND(20)*3:V3=V2+42+RND(20)*3
10010 L=31190:V=V1:GOSUB9000:L=31192:V=V2:GOSUB9000:L=31194:V=V3
:GOSUB9000
10020 POKE16526,0:POKE16527,121:K=USR(0):V=31166:L=16526:GOSUB90
00
10030 DN(1,1)=PEEK(15016):DN(1,2)=PEEK(15752):DN(2,1)=PEEK(15030
```

Program Listing 1 Continues

The entire wheel will roll once before your eyes.

The string defined in line 130 configures the symbols as they will appear on the slot machine wheel.

Lines 131-133 analyze the wheel order string and call appropriate subroutines to POKE the necessary graphics characters into the wheel image area.

Lines 135-138 do some housekeeping, 137 and 138 set up the payoff table, 140-150 set the slot machine on the screen and 160-200 accept and decode commands and execute the drop coin command.

Section 600 uses the wheel image string and the payoff table to calculate current payoff odds. This routine is useful for customizing payoff odds.

Section 700 displays a payoff chart on the screen.

After playing, section 800 prints how much you won or lost and lets you restart the game.

Section 900 lets you add money to your pot if you go broke. All additional money is kept track of by section 800.

Subroutines at lines 1000, 2000, 3000, 4000 and 5000 POKE graphics for the single bar, double bars, triple bars, seven and blank space, respectively, into the wheel image starting at K.

The subroutine beginning at line 9000 POKEs the two-byte integer value of variable V into memory locations L and L plus one.

Section 10000 spins the wheels via a USR command and determines if you have won. There are three calls to subroutine 9000. The three two-byte numbers POKEd into locations 31190, 31192 and 31194 determine how long the first, second and third wheels will spin. These locations correspond with NOTCH1, NOTCH2 and NOTCH3 on the Assembly listing (Program Listing 2).

Win determination is done by PEEKing at certain locations in the video display. Section 11000 is accessed each time section 10000 determines you won. After looking up your winnings in the payoff table, it drops coins into your pot (complete with the plinking sound).

Subroutine 1200 POKEs the machine language routine into

See List of Advertisers on page 338

We've Turned The Hard Disks Market

UPSIDEDOWN!!!

We want you to have all the power that your TRS-80 is capable, at prices that have other manufacturers cross-eyed! These Five and Ten Megabyte units are easy to use, just plug them into the expansion buss of your Model I or Model III. Comes complete with the fantastic DOS PLUS 4.0 Operating System! Available in three configurations: 5 Megabyte Fixed, 10 Megabytes Fixed, & 10 Megabytes RemovableCartridge. Look at the incredible low prices of our systems!

SYSTEM PRICING

5 Megabyte Winchester Fixed Disk

201505	Model I Version	$2795.00
203505	Model III Version	$2795.00

10 Megabyte Winchester Fixed Disk

201510	Model I Version	$3195.00
203510	Model III Version	$3195.00

10 Megabyte Winchester Removable Cartridge Disk

201511	Model I Version	$5395.00
203511	Model III Version	$5395.00

Systems for other computers available soon . . Call for info

BT ENTERPRISES

171 Hawkins Road
Centereach, New York 11720

(516) 981-8568 (Voice)
(516) 588-5836 (Data)
MNET-70331, 105

VISA MasterCard

Dealer Inquiries Welcome

ADD $10 S&H
NYS res. add appr. tax

300

Program Listing 1 Continued

```
):DN(2,2)=PEEK(15766):DN(3,1)=PEEK(15044):DN(3,2)=PEEK(15700)
10040 IFDN(1,1)=191ANDDN(2,1)=191ANDDN(3,1)=191THENWV=2:GOTO1100
0
10050 IFDN(1,2)=188ANDDN(2,2)=188ANDDN(3,2)=188THENWV=3:GOTO1100
0
10060 IFDN(1,1)=140ANDDN(2,1)=140ANDDN(3,1)=140THENWV=4:GOTO1100
0
10065 IFDN(1,1)=150ANDDN(2,1)=150ANDDN(3,1)=150THENWV=5:GOTO1100
0
10070 IF(DN(1,1)=150ORDN(2,1)=150ORDN(3,1)=150)THEN10090ELSEIF(D
N(1,1)<>120ORDN(1,2)<>120)AND(DN(2,1)<>120ORDN(2,2)<>120)AND(DN(
3,1)<>120ORDN(3,2)<>120)THENWV=1:GOTO11000
10090 GOTO150
10999 '  DETERMINE PAYOFF AND PAY WINS
11000 PT(5,5)=JP:MP=PT(WV,NC):IFMP>TCTHENMP=TC:TC=0ELSETC=TC-MP
11005 IFWV=5ANDNC=5GOTO11030
11010 FORK=1TOMP:PO=PO+1:PRINT@1010,PO;:X=USR(261+RND(15)):FORL=
1TO30:NEXTL:NEXTK
11020 GOTO150
11030 FORK=1TO10:PRINT@490,"J A C K P O T";:FORL=350TO257STEP-1:
X=USR(L):NEXTL:PRINT@490,"              ";:FORL=350TO257STEP-1:X=
USR(L):NEXTL:NEXTK:PO=PO+PT(5,5):PRINT@1010,PO;:GOTO150
12000 ' POKE MACHINE LANGUAGE ROUTINE
12010 FORK=30976TO31202
12020 READX:POKEK,X:NEXTK
12030 RETURN
12040 DATA  42,214,121,124,181,204,181,121, 40, 31
12050 DATA  43, 34,214,121, 17,194, 60, 42,220,121
12060 DATA 205,152,121, 42,220,121, 17, 12,  0, 25
12070 DATA 124,254,128, 32,  3, 33, 24,122, 34,220
12080 DATA 121, 42,216,121,124,181,204,181,121, 40
12090 DATA  31, 43, 34,216,121, 17,200, 60, 42,222
12100 DATA 121,205,152,121, 42,222,121, 17, 12,  0
12110 DATA  25,124,254,128, 32,  3, 33, 24,122, 34
12120 DATA 222,121, 42,218,121,124,181,200, 43, 34
12130 DATA 218,121, 17,222, 60, 42,224,121,205,152
12140 DATA 121, 42,224,121, 17, 12,  0, 25,124,254
12150 DATA 128, 32,  3, 33, 24,122, 34,224,121, 62
12160 DATA   2,211,255,  1,  2,  0,205, 96,  0, 62
12170 DATA   1,211,255,  1,  2,  0,205, 96,  0, 62
```

Program Listing 1 Continues

upper memory. It also contains the machine language data; thanks to Dan and Cass Lewart (see "DATAGEN," *80 Micro*, August 1981).

The Assembly Listing, ROLLEM

A separate block of code is used to spin each wheel. Each block has its own notch counter (how many more lines to scroll the wheel through the wheel image) and pointer (pointing to where to start copying the wheel from next time) and each puts its output to a different area on the screen. The ROLLEM section explanation (lines 250-420 in Listing 2) also applies to the sections ROLL2 and ROLL3.

The program first checks the notch counter, set in Basic line 10010. If it is at zero, this wheel does not have to spin anymore. A time delay routine is called and the program moves to the next section. The time delay keeps the other wheels from speeding up after one stops.

To spin the wheel, Notch is decremented and put back. Registers DE are set to point to

Creative Computer

Dept. 801
1236 E. Colonial Drive
Orlando, Florida 32803 USA
Voice (305) 894-4744
BBS 24 Hour Electronic Mail
Order (305) 277-0473
Micronet 71555,520

Write For Free Catalog

Over 700 items in Diskettes, Business Software, Games, Utilities, Paper, Labels, Ribbons, Checks, Storage Boxes, Furniture, Binders and Hardware. ® - Mfg. Trademark

FREE SHIPPING except hardware

CP/M®

DISK WITH / MANUAL
MANUAL / ONLY

MICROPRO®
Super Sort I ....$192/$36
Calc Star .....$250/$36
Spell Star $175/NA
Word Star .....$315/$54
Mail Merge $104/NA
Word Star/
Mail Merge ...$410/NA
Word Master ....$115/$36
Data Star .....$244/$54

MICROSOFT®
Basic-80 .....$285
Basic Compiler $325
Cobol-80 .....$570
Edit-80 .....$ 82
Fortran $345
Macro-80 .....$140
X macro-86 .....$255
M-Sort $120
Mu Math/
Mu Simp $220
Mu Lisp/
Mu Star $170
Typing Tutor .....$ 27

PEACHTREE®
General Ledger .$399/$40
Acct Receivable $399/$40
Acct Payable ...$399/$40
Payroll .....$399/$40
Inventory .....$399/$40
Surveyor .....$399/$40
Property Mgt ...$799/$40
CPA Client
Write-up .....$799/$40
P5 Version ....Add $129

MISC.
Plastic File Box
50-5¼" .....$ 19
5¼" Library Case .$ 3
8" Library Case ...$ 4
Head Clean Kit....$ 23
Floppy Saver $11.95
Floppy Saver Rings$ 6.95

RIBBONS
Radio Shack®
LP 1, 2 & 4....4 pk $18.95
LP 3 & 5 .3 pk refill $13.95
LP 6 & 8 .3 pk refill $11.95
Daisy Wheel
(black) 10 pk refill $24.95
(brown, blue or red)
.....6 pk refill $24.95
Epson MX-80/& F/T
.....3 pk refill $16.95

APPLE II

MICROSOFT®
Z-80 Softcard $295
RAM card $155
Basic Compiler $299
Fortran-80 .....$175
Cobol-80 .....$499
Tasc $135
Typing Tutor .....$ 21
Olympic Decathlon .$ 25

MICROPRO®
Super Sort 1....$155/$36
Mail Merge .....$ 85/NA
Word Star .....$238/$36
Word Star/
Mail Merge ...$319/NA
Calc Star .....$155/$36
Data Star .....$225/$54
Spell Star $149/NA

PERSONAL SOFTWARE®
Visicalc 3.3.....$155
Visiterm $127
Visiplot $145
Visidex $155
Visitrend/Plot $225
Visifile $195
Desktop/Plan II $155
Visipak $555

RADIO SHACK

MODEL I & III®
NEWDOS 80 2.0 ....$139
LDOS 5.1 115
Maxi-Manager .....$ 89
GAMES
Adventure International
Big Five Qty,1-5% Off
Avalon Hill 2-10% Off
Med System 3-15% Off
Acorn 5-20% Off
Epyx and Others
MODEL II®
CREATIVE COMPUTER
Depreciation
System $350/25
Inventory Control $495/25
Other Acctg. SystemsCall
Yahtzee .....$ 24.95

HARDWARE

PRINTERS
Epson MX 100 .....Call
Epson MX 80FT .....Call
Epson MX 80 .....Call
Okidata 80A $349
Okidata 82A $489
Okidata 83A $729
Okidata 84 .....$1049
NEC PC8023A $550
NEC 7710 .....Call
NEC 7720 .....Call

MODEMS
Hayes Smart Modem$245
Hayes Clock-
Cronograph $235
Lexicon-11 Acoustic $139
Lexicon-12
Direct/Acoustic ..$159

MONITORS
Amdek 100 .....$139
Amdek 100 Green...$155
Amdek Color I $349
Sanyo 4509 9" $199
Sanyo 5109 9" Grn ..$219
Sanyo 6013 13"Color $419
NEC KB1201 M.....$179
NECJC1201 M Color .$349

TERMINALS
Adds Viewpoint $589
Televideo 910 .....$569
Televideo 920C.....$739
Televideo 912C.....$679
Televideo 950C.....$929

190

Most orders out in 24 hours with VISA, M/C, Money Order, Cashier Check, Bank Wire and C.O.D. Personal check over $150 allow 10-14 days. Mail order only. Prices subject to change 9-8 M-F, 9-6 Sat.

Program Listing 1 Continued

```
12180 DATA   0,211,255,  1,  0,  2,205, 96,  0,195
12190 DATA   0,121,  6,  9,197,  6, 12,126, 10, 35
12200 DATA  19, 16,250,235,  1, 52,  0,  9,235,124
12210 DATA 254,120, 32,  3, 33, 24,122,193, 16,230
12220 DATA 201,245,  1,195,  0,205, 96,  0,241,201
12230 DATA 205,127, 10, 62,  1, 14,  0, 69, 47,230
12240 DATA   3,211,255, 13, 40,  4, 16,247, 24,243
12250 DATA  37, 32,242,201,  0,  0,  0,  0,  0,  0
12260 DATA   0,  0,  0,  0,  0,  0,255
```

"To win the jackpot, you have to play five coins and get three sevens."

where the wheel goes on the screen and HL will point to the next line in the wheel image. Then subroutine PUTCOL puts the wheel image on the screen. Finally 12 is added to the wheel image pointer (each horizontal line is 12 bytes long; adding 12 sets the pointer to the next horizontal line). After making sure it's not pointing past the wheel image, PUTCOL saves the pointer for the next pass.

After each wheel spins one notch, a click sound is sent to the cassette port. The third wheel will stop last because Basic line 10000 POKEs the largest number into NOTCH3. Assembly line 720 checks for this.

The PUTCOL routine, used by the three wheel moving sections, moves a chunk of the wheel image to the video screen. First a counter is set to move nine lines (the length of one wheel display window—line 1090). Twelve bytes are then moved to the video display (lines 1100–1160), and the video

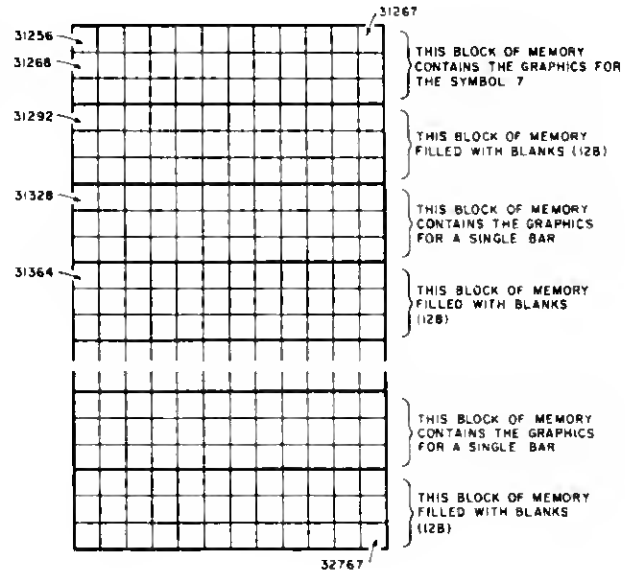
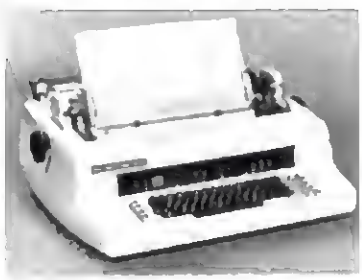


Fig. 1. Layout of the slot machine wheel image. Memory locations run sequentially from the upper left to the lower right corners. The order of the symbols is dictated by Basic line 130.

COOSOL COMPUTER PROOUCTS

PRINTERS



- EPSON MX70 $299
- EPSON MX80 GRAFTRAX CALL
- EPSON MX80 F/T GRAFTRAX CALL
- EPSON MX100 GRAFTRAX + CALL
- NEC PC 8023A C $500
- OKIDATA 82A $499.83A $739
- CITOH 8510P 510 3510R $549
- TALLY MT 1602 OR 5 $1495
- TALLY MT 1802 OR 5 $1795
- NEC 3510 1, 3515 1 3530 1 $1795
- NEC 7710 1 7715 1 7730 1 $2495
- NEC 7720 1 7725 1 $2995
- CITOH FP 1500 25PU, H OR Q $1350
- CITOH FP 1500 25RU $1450
- CITOH FP 1500 45PU OR Q $1795
- CITOH FP 1500 45RU $1995
  DIABLO
- 630R132 $2,395. • 630R101 $1749
- 630R104 $2,395 • 630K104 $2949

I8M/NEC 12" COLOR CHARACTER DISPLAY

High-Resolution Display By NEC
The JC 1202DH features high resolution for a 2 000 character display capacity (80 characters x 25 lines)

JC 1202DH Color Character Display unit is designed for both character and graphics. It operates with a TTL level video signal in combination with a micro computer system

R.G.B Direct Drive System
Sharper, clearer pictures result from separate R G B and V H sync video input signals

JC-1202DH $799

TELEVIDED TERMINALS
- 910C $595 • 912C $705
- 920C $750 • 950C $959
- COMREX AND NEC CALL
- ADDS Viewpoint WB2101 or WB2102 $595

NEC COMPUTER

- ABOVE NEC 8000 SYSTEM $2 345
- NEC Computer PC 8001A CALL
- NEC I/O Unit PC 8012A CALL
- NEC I/O Port PC 8033A CALL
- NEC Disk Drive PC 8031A CALL
- NEC Disk Drive PC 8032A CALL
- NEC Dot Printer PC 8023A C CALL
- NEC GR Monitor JB 1201 CALL
- NEC COL Monitor JC 1202 CALL
- NEC Accessories & Software CALL

OTHER COMPUTERS
- ALTOS MTU/Floppy/Harddisk CALL
- ADDS Computer Systems CALL
- ATARI Computer and Accessories CALL
- SANYO Computer CALL

Calif. (714) 545-2216

(800) 854-8498

COOSOL, INC. P.O. BOX 743, ANAHEIM, CALIFORNIA 92805-0743

105

See List of Advertisers on page 338

pointer register DE is moved to the next line (lines 1170–1200). This repeats until all nine lines are moved (lines 1260–1270). If the wheel image pointer (register HL) goes past the wheel image, it is pointed back to the top of the image (lines 1210–1250).

The subroutine BALANC is a time delay routine (0060H is a ROM time delay routine) and Sound is a sound routine (see "Super Sound," *80 Micro* May 1980).

How to Play

Before CLOADing set your memory size to 30900. This allows room for the ROLLEM routine and the wheel image. Then run the program.

After the instruction set you will be asked to wait a minute while the program sets up the wheel and machine language routine.

You start with 50 coins in your pot. The jackpot starts with 15,000 coins. Pressing the down arrow drops a coin into the machine—you'll hear a "ker-klink" sound. You can deposit up to five coins per play. To pull the arm, press Enter. The three wheels will spin and stop one by one. Winning combinations are (in order from most to least payoff) three sevens, three triple bars, three double bars, three single bars and three bars of any type. The symbols have to line up with the center arrows to win. Symbols which stop above or below the arrows do not count in the win. The jackpot changes continuously depending on how many coins are in the machine. To win the jackpot you have to play five coins and get three sevens.

Real slot machines have payoff tables attached to them. You can get one, at any time, by pressing the P key. The win combinations are along the left side of the table and the number of coins played is along the top. If you were to get three double bars after depositing two coins you would win 80 coins. Press any key to return to the game.

Your 50 coin allotment probably won't last long. To dig up more cash hit the M key. Type in how much you want and hit Enter. All additions are reported when you quit.

You will have to stop sooner or later. To do so, hit the Q key. You will then be given an analysis of how much money you used, how much you have left and how much you lost or gained.

Changing the Odds

The wheels and payoff table part of the program is in Basic. Before we start changing things, the odds function should be explained.

Press the O key. This feature will make your job of customizing a lot easier. The chart gives you the odds for all five win pos-

Program Listing 2. Assembly Language

```
                00100 ;**********************
                00110 ;*  SLOT MACHINE SUB   *
                00120 ;**********************
                00130 ;
                00140 ;  BY RON BALEWSKI
                00150 ;
                00160 ;   SPINS SLOT MACHINE WHEELS
                00170 ;  ALSO CONTAINS A SOUND ROUTINE
                00180 ;
                00190 ;
3C00            00200 VIDEO   EQU     3C00H
7900            00210         ORG     7900H
                00220 ;
                00230 ; IF (NOTCH1)<>0 THEN DEC (NOTCH1), SLIDE FIRST WHEEL ONE
                00240 ;    LINE   ELSE CALL BALANC
7900 2AD679     00250 ROLLEM  LD      HL,(NOTCH1)
7903 7C         00260         LD      A,H
7904 B5         00270         OR      L                ;NOTCH 1 ZERO?
7905 CC8579     00280         CALL    Z,BALANC         ;IF SO, BALANCE TIMES
7908 281F       00290         JR      Z,ROLL2          ;  AND GO ROLL SECOND
790A 2B         00300         DEC     HL               ;DEC (NOTCH1)
790B 22D679     00310         LD      (NOTCH1),HL
790E 11C23C     00320         LD      DE,VIDEO+192+2   ;FIRST WHEEL GOES HERE
7911 2ADC79     00330         LD      HL,(PTR1)        ;CURRENTLY HERE IN WHEEL
7914 CD9879     00340         CALL    PUTCOL           ;MOVE SECT. OF WHEEL
7917 2ADC79     00350         LD      HL,(PTR1)
791A 110C00     00360         LD      DE,12            ;12 BYTES MOVED EACH LINE
791D 19         00370         ADD     HL,DE
791E 7C         00380         LD      A,H
791F FE00       00390         CP      00H              ;PAST END OF WHEEL?
7921 2003       00400         JR      NZ,OK1
7923 21187A     00410         LD      HL,7A18H         ;SET TO START OF WHEEL
7926 22DC79     00420 OK1     LD      (PTR1),HL
                00430 ;
                00440 ;
                00450 ; ROLL SECOND WHEEL -- IDENTICAL TO FIRST, EXCEPT WITH
                00460 ;   DIFFERENT POINTERS & WHEEL LOCATION
7929 2AD879     00470 ROLL2   LD      HL,(NOTCH2)
792C 7C         00480         LD      A,H
792D B5         00490         OR      L
792E CC8579     00500         CALL    Z,BALANC
7931 281F       00510         JR      Z,ROLL3
7933 2B         00520         DEC     HL
7934 22D879     00530         LD      (NOTCH2),HL
7937 11D03C     00540         LD      DE,VIDEO+192+16
793A 2ADE79     00550         LD      HL,(PTR2)
793D CD9879     00560         CALL    PUTCOL
7940 2ADE79     00570         LD      HL,(PTR2)
7943 110C00     00580         LD      DE,12
7946 19         00590         ADD     HL,DE
7947 7C         00600         LD      A,H
7948 FE00       00610         CP      00H
794A 2003       00620         JR      NZ,OK2
794C 21187A     00630         LD      HL,7A18H
794F 22DE79     00640 OK2     LD      (PTR2),HL
                00650 ;
                00660 ;
                00670 ; THIRD WHEEL ROLL -- SAME AS 1ST AND 2ND EXCEPT
                00680 ;     RET WHEN (NOTCH3) GETS TO 0
7952 2ADA79     00690 ROLL3   LD      HL,(NOTCH3)
7955 7C         00700         LD      A,H
7956 B5         00710         OR      L
7957 C8         00720         RET     Z
7958 2B         00730         DEC     HL
7959 22DA79     00740         LD      (NOTCH3),HL
795C 11DE3C     00750         LD      DE,VIDEO+192+30
795F 2AE079     00760         LD      HL,(PTR3)
7962 CD9879     00770         CALL    PUTCOL
7965 2AE079     00780         LD      HL,(PTR3)
7968 110C00     00790         LD      DE,12
796B 19         00800         ADD     HL,DE
796C 7C         00810         LD      A,H
796D FE00       00820         CP      00H
796F 2003       00830         JR      NZ,OK3
7971 21187A     00840         LD      HL,7A18H
7974 22E079     00850 OK3     LD      (PTR3),HL
```

Program Listing 2 Continues

MULTI-USER OASIS HAS THE FEATURES PROS DEMAND. READ WHY.

(THEN COMPARE.)

Computer experts (the pros) usually have big computer experience. That's why when they shop system software for Z80 micros, they look for the big system features they're used to. And that's why they like Multi-User OASIS. You will too.

DATA INTEGRITY: FILE & AUTOMATIC RECORD LOCKING

The biggest challenge for any multi-user system is co-ordinating requests from several users to change the same record at the same time.

Without proper co-ordination, the confusion and problems of inaccurate or even destroyed data can be staggering.

Our File and Automatic Record Locking features solve these problems.

For example: normally all users can view a particular record at the same time. But, if that record is being updated by one user, automatic record locking will deny all other users access to the record until the up-date is completed. So records are always accurate, up-to-date and integrity is assured.

Pros demand file & automatic record locking. OASIS has it.

SYSTEM SECURITY: LOGON, PASSWORD & USER ACCOUNTING

Controlling who gets on your system and what they do once they're on it is the essence of system security.

Without this control, unauthorized users could access your programs and data and do what they like. A frightening prospect isn't it?

And multi-users can multiply the problem.

But with the Logon, Password and Privilege Level features of Multi-User OASIS, a system manager can specify for each user which programs and files may be accessed—and for what purpose.

Security is further enhanced by User Accounting—a feature that lets you keep a history of which user has been logged on, when and for how long.

Pros insist on these security features. OASIS has them.

EFFICIENCY: RE-ENTRANT BASIC

A multi-user system is often not even practical on computers limited to 64K memory.

OASIS Re-entrant BASIC makes it practical.

How?

Because all users use a single run-time BASIC module, to execute their compiled programs, less memory is needed. Even if you have more than 64K, your pay-off is cost saving and more efficient use of all the memory you have available—because it services more users.

Sound like a pro feature? It is. And OASIS has it.

AND LOTS MORE...

Multi-User OASIS supports as many as 16 terminals and can run in as little as 56K memory. Or, with bank switching, as much as 784K.

Multi-Tasking lets each user run more than one job at the same time.

And there's our BASIC—a compiler, interpreter and debugger all in one. An OASIS exclusive.

Still more: Editor; Hard & Floppy Disk Support; Keyed (ISAM), Direct & Sequential Files; Mail-Box; Scheduler; Spooler; all from OASIS.

Our documentation is recognized as some of the best, most extensive, in the industry. And, of course, there's plenty of application software.

Put it all together and it's easy to see why the real pros like OASIS. Join them. Send your order today.

OASIS

MAKES MICROS RUN LIKE MINIS

OASIS IS AVAILABLE FOR

SYSTEMS Altos Compucorp Cromemco; Delta Products Digital Group, Digital Microsystems Dynabyte, Godbout IBC; Index Intersystems North Star, Onyx SD Systems TRS 80 Mod II Vector Graphic Vorimax

CONTROLLERS Bell Controls Cameo Corvus Konan Microfunction Micropolis, Tarbell Teletek, Thinkertoys, X Comp

Write for complete free Application Software Directory

PLEASE SEND ME:

Product	Price with Manual	Manual Only
OPERATING SYSTEM (Includes EXEC Language, File Management User Accounting Device Drivers Print Spooler, General Text Editor etc.) SINGLE-USER / MULTI-USER	$150 / 350	$17.50 / 17.50
BASIC COMPILER/ INTERPRETER/DEBUGGER	100	15.00
RE-ENTRANT BASIC COMPILER/INTERPRETER/ DEBUGGER	150	15.00
DEVELOPMENT PACKAGE Macro Assembler, Linkage Editor, Debugger)	150	25.00
TEXT EDITOR & SCRIPT PROCESSOR	150	15.00
DIAGNOSTIC & CONVERSION UTILITIES (Memory Test, Assembly Language, Converters File Recovery Disk Test File Copy from other OS, etc.)	100	15.00
COMMUNICATIONS PACKAGE (Terminal Emulator, File Send & Receive)	100	15.00
PACKAGE PRICE (All of Above) SINGLE-USER / MULTI USER	500 / 850	60.00 / 60.00
FILE SORT	100	15.00
COBOL-ANSI '74	750	35.00

Order OASIS from

Phase One Systems, Inc.
7700 Edgewater Drive, Suite 830
Oakland, CA 94621
Telephone (415) 562-8085
TWX 910-366-7139

NAME _____
STREET (NO BOX #) _____
CITY _____
STATE _____ ZIP _____
AMOUNT $ _____
(Attach system description, add $3 for shipping. California residents add sales tax)
☐ Check enclosed ☐ VISA
☐ UPS C.O.D. ☐ Mastercharge
Card Number _____
Expiration Date _____
Signature _____

NOW AVAILABLE FOR TRS 80 MOD II

Program Listing 2 Continued

```
                00060 ;
                00070 ;
                00080 ; OUTPUT A CLICK TO THE CASSETTE PORT AND DELAY
7977 3E02       00090         LD      A,2             ;SEND OUTPUT HIGH
7979 D3FF       00900         OUT     (255),A
797B 010200     00910         LD      BC,2            ;DELAY
797E CD6000     00920         CALL    0060H
7981 3E01       00930         LD      A,1             ;SEND OUTPUT LOW
7983 D3FF       00940         OUT     (255),A
7985 010200     00950         LD      BC,2            ;DELAY
7988 CD6000     00960         CALL    0060H
798B 3E00       00970         LD      A,0             ;OUTPUT OFF
798D D3FF       00900         OUT     (255),A
798F 010002     00990         LD      BC,0200H        ;DELAY
7992 CD6000     01000         CALL    0060H
7995 C30079     01010         JP      ROLLEM          ;ROLL WHEELS AGAIN
                01020 ;
                01030 ;
                01040 ;           **********
                01050 ;           * PUTCOL *
                01060 ;           **********
                01070 ; MOVE 9 LINES OF THE WHEEL STARTING AT (HL) TO THE VIDEO
                01080 ; SCREEN STARTING AT LOCATION (DE)
7998 0609       01090 PUTCOL  LD      B,9             ;MOVE 9 LINES
799A C5         01100 NXTLIN  PUSH    BC
799B 060C       01110         LD      B,12            ;EACH LINE 12 BYTES LONG
799D 7E         01120 NXTBYT  LD      A,(HL)          ;MOVE A BYTE
799E 12         01130         LD      (DE),A
799F 23         01140         INC     HL              ;BUMP SOURCE & DEST. PTRS
79A0 13         01150         INC     DE
79A1 10FA       01160         DJNZ    NXTBYT          ;DO WHOLE LINE
79A3 EB         01170         EX      DE,HL
79A4 013400     01180         LD      BC,52           ;GET TO NEXT VIDEO LINE
79A7 09         01190         ADD     HL,BC
79A8 EB         01200         EX      DE,HL
79A9 7C         01210         LD      A,H
79AA FE80       01220         CP      80H             ;IF POINTER TO WHEEL PAST
                01230                                 ;END OF WHEEL,FOLD TO TOP
79AC 2003       01240         JR      NZ,NOROLL
79AE 21187A     01250         LD      HL,7A18H        ;START OF WHEEL IMAGE
79B1 C1         01260 NOROLL  POP     BC
79B2 10E6       01270         DJNZ    NXTLIN          ;DO ALL 9 LINES
79B4 C9         01280         RET
                01290 ;
                01300 ;
                01310 ;
                01320 ;           **********
                01330 ;           * BALANC *
                01340 ;           **********
                01350 ;  DELAY TO KEEP WHEELS RUNNING AT THE SAME SPEED NO
                01360 ;  MATTER HOW MANY ARE RUNNING.  IE. WHEN THE FIRST
                01370 ;  WHEEL STOPS, BABANC WILL BE CALLED ONCE.  WHEN THE
                01371 ;  FIRST & SECOND STOP, BALANC WILL BE CALLED TWICE.
79B5 F5         01380 BALANC  PUSH    AF
79B6 01C300     01390         LD      BC,195
79B9 CD6000     01400         CALL    0060H
79BC F1         01410         POP     AF
79BD C9         01420         RET
                01421 ;
                01422 ;
                01423 ;           *********
                01424 ;           * SOUND *
                01425 ;           *********
                01426 ;  SOUND GENERATING ROUTINE CALLED BY BASIC -- NOT CALLED
                01427 ;  BY ABOVE ASSEMBLY-LANGUAGE PROGRAM
79BE CD7F0A     01430 SOUND   CALL    0A7FH
79C1 3E01       01440         LD      A,1
79C3 0E00       01450         LD      C,0
79C5 45         01460 SOUND2  LD      B,L
79C6 2F         01470         CPL
79C7 E603       01480 SOUND3  AND     3
79C9 D3FF       01490         OUT     (255),A
79CB 0D         01500         DEC     C
79CC 2004       01510         JR      Z,SOUNDO
79CE 10F7       01520         DJNZ    SOUND3
79D0 10F3       01530         JR      SOUND2
79D2 25         01540 SOUNOD  DEC     H
79D3 20F2       01550         JR      NZ,SOUND3
79D5 C9         01560         RET
79D6 0000       01570 NOTCH1  DEFW    0
79D8 0000       01580 NOTCH2  DEFW    0
79DA 0000       01590 NOTCH3  DEFW    0
79DC 0000       01600 PTR1    DEFW    0
79DE 0000       01610 PTR2    DEFW    0
79E0 0000       01620 PTR3    DEFW    0
0000            01630         END
00000 TOTAL ERRORS
```

sibilities. My set-up returns $1.04 for each dollar played. In a casino, the machine would lose money over the long run. (If the amount returned is less than a dollar, the casino makes money.)

To change the symbols on the wheels, you have to change Basic line 130. In the string, seven stands for the symbol seven, T is for the triple bar, D is the double bar, and S is the single bar. The order from left to right is the order of the wheel from top to bottom. Changing a character in this string changes the wheel.

As an experiment, change the first seven to an S and then run the program. Once the program is running, press O for the odds table. The odds against sevens went way up while the odds against single bars went down. Also the amount to win went up to $1.20 per dollar.

Changing the payoff table is just as easy, in Basic line 137.

"Pressing the down arrow drops a coin into the machine."

PT(1,1) is the payoff for three bars any kind, PT(2,1) is for three single bars, PT(3,1) is for three double bars, PT(4,1) is for triple bars and PT(5,1) is for sevens. All payoffs set are for one coin played. The payoffs for two to five coins are calculated from these values, so you needn't worry about them. To change the three bars any kind payoff to 20 per coin, change PT(1,1) = 10 to PT(1,1) = 20. Then run the program and get an odds table. Winnings went up to $1.83 for each dollar played. By requesting a payoff chart you can see that the three bars line is indeed different.

I hope this program saves you money by alleviating the urge to lose to a real slot machine. It did for me. If you hit the jackpot using the odds presented, let me know—I've never done it. Good luck, and may your wheels forever stop on sevens! ■

NEW
40 TRACK
DISK DRIVES
with
POWER SUPPLY & CASE
for
RADIO SHACK
and
OTHER COMPUTERS

$179

OMNITEK Computers
International, Inc.
1300 Main Street
Tewksbury, MA 01876
(617) 851-4580

LIMITED SUPPLY
LIMITED SUPPLY

Shipping extra FOB Tewksbury
Master Card, Visa, or Bank Checks accepted

195

WHY ARE
SMART TERMINAL PROGRAMS
SO EXPENSIVE??

Good question. Maybe it's precedence. The first widely known terminal program had a relatively big price tag, like the first word processor, and it was worth it because it was the only one out. But nearly every one that has come along since has maintained an $80 to $150 price tag, and it would seem that you are forced to pay it or (admit it) trade it. Some of these programs do a lot, and some don't. But if you are in the market for such a program you should look closely at TELCOM from Mumford Micro Systems. Our price is $39.95, and it is supplied on disk for Model I or Model III. TELCOM is menu driven, extremely easy to use, and supports the following features:

- Terminal Mode:
  - Save data on disk.
  - Spooled printer output.
  - Upper and lower case support.
  - 8 programmable automatic (log on) messages.
  - 10 programmable character keys for special codes.
- Dump the RAM buffer to a disk file.
- Transmit a disk file in ASCII or binary. No conversion is necessary.
- Recieve a file in ASCII or binary.
  - These transmit and receive functions automatically generate and exchange a 16 bit checksum to verify valid data when the person on the other end is also running TELCOM. If the transmission is correct, TELCOM tells you so.
- Define a buffer "open/close" protocol to save only selected data.
- Define a "halt/resume" (Xon/Xoff) protocol for file transfers.
- Easily examine or change baud rate, bits per word, parity, and stop bits.
- Save the entire program as configured on disk.

In addition to the above major features there are many user conveniences. If you want to communicate with large mainframe computers, data banks, personal information services, bulletin boards, another computer across the room or your buddy across town; or if you just want an easier to use smart terminal program, look into TELCOM. If it doesn't do everything you need at a very reasonable price you are welcome to a full refund. And if $39.95 seems too cheap for a smart terminal program, you can send $79.95 instead!

[illegible] postage. California residents add [illegible] and COD orders [illegible]

MUMFORD MICRO SYSTEMS

[illegible]

[illegible]

COLOR COMPUTER USERS

THE POWERFUL FLEX DISK OPERATING SYSTEM WITH HUNDREDS OF SOFTWARE PACKAGES IS NOW AVAILABLE!

Now you can run FLEX, OS-9 and Radio Shack disk software on your Color Computer. If you have a 32K Color Computer with the Radio Shack disk system, all you need to do is make a trivial modification to access the hidden 32K, as described in the Feb. issue of COLOR COMPUTER NEWS and the April issue of '68' Micro. You can get FLEX from us right now. OS-9 will be ready by summer. Please note that this will only work with the Radio Shack disk system and 32K/64K memory chips that RS calls 32K. Maybe they put 64K's in yours, too. If you don't have a copy of the article, send a legal size SASE (40¢ stamps) and we'll send it to you.

In case you don't understand how this works, I'll give you a brief explanation. The Color Computer was designed so that the roms in the system could be turned off under software control. In a normal Color Computer this would only make it go away. However, if you put a program in memory to do something first (like boot in FLEX or OS-9), when you turn off the roms, you will have a full *64K RAM* System with which to run your program.

Now, we need the other half of the 64K ram chips to work, and this seems to be the case most of the time, as the article states. Of course, you could also put 64K chips in.

Some neat utilities are included.

MOVEROM moves Color Basic from ROM to RAM. Because it's moved to RAM you can not only access it from FLEX, you can run it and even change it!! You can load Color Computer cassette software and save it to FLEX disk. Single Drive Copy, Format and Setup commands plus an online help system are included.

Installing FLEX is simple. Insert the disk and type:

RUN "FLEX"

That's all there is to it! You are now up and running in the most popular disk operating system for the 6809. There are hundreds of software packages now running under the FLEX system. Open your Color Computer to a whole new world of software with FLEX.

FLEX $99.00

INCLUDES OVER 25 UTILITIES!

FLEX Editor	$ 50.00
FLEX Assembler	$ 50.00
FLEX Standard BASIC	$ 65.00
FLEX Extended Business BASIC	$100.00

Other languages available include, FORTH, Pascal, Fortran77, 'C,' A/BASIC Compiler, plus more.

Application packages include; A/R, G/L, A/P, Inventory, Electronic Spreadsheets, Accounting, Database programs and more. SEND FOR LIST.

TRS-80 COLOR COMPUTER COMPLETE WITH 64K RAM, 24K ROM, SINGLE DISK DRIVE AND FLEX, SET UP AND READY TO RUN FOR ONLY $1,275. Includes 60 day extended warranty. If you have a Computer, call about RS disk controllers and drives.

FRANK HOGG LABORATORY, INC.
130 MIDTOWN PLAZA • SYRACUSE NEW YORK 13210 • (315)474-7856

262

See List of Advertisers on page 338

TRS-80* Computer Owners...

GREATER VALUES

New Low Prices
for Percom Model III Disk Drives!

Complete First-Drive Systems
from $449

Internally mounted drives that feature double- or single-density storage, comprehensive pre-delivery testing, 48-hour burn-in and, best of all, Percom's widely acclaimed disk controller. A First-Drive System includes the four-drive disk controller, one or two drives, power supplies, cables and a fully illustrated owners manual. Use Model III TRSDOS*, Percom OS-80 + and all other Model III compatible DOSs

Note: If you prefer not to make the First-Drive System installation, we'll do it for only $29.95 plus shipping. This includes a 48-hour operating burn-in of your Model III computer, installation of the drive system and final checkout of the expanded system.

Our Own Fully Tested Drives from only $275

- Every Access Floppy Disk drive is electrically tested, mechanically tested and burned-in 48 hours under operating conditions. Look for the signed test list in the shipping carton.
- AFD drives are capable of either single- or double-density operation. Store up to 364 Kbytes (formatted) in double density. Store twice the data on a single diskette using AFD "flippy" drives."
- 15-day free trial offer...comprehensive 90-day limited warranty...unbeatable prices...AFD-100 @ $275.00, -100F @ $329.00, -200 @ $429.95, -200F @ $449.95.

How to order – Order by calling Access Unlimited toll-free on **1-800-527-3475**. Or order by mail. Orders may be charged to a VISA or Master Card account, or paid by cashier's check, certified check or money order. Sorry, we cannot accept personal checks. We pay freight (surface only) and insurance charges for shipments in U.S. on orders over $1,000.00. Add approximate insurance and shipping charges for orders under $1,000.00. If in doubt about these charges, ask when you call in your order. Texas residents include 5% sales tax. Minimum mail order $20.00. Allow 2 to 4 weeks for delivery.

Texas (214) 340-5368

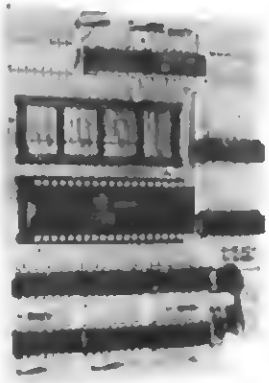
Save! VISA and Master Card charges are not deposited until the day your order is shipped.

PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

Everybody's Favorites – for Less!

Percom Data Separator	$23.95
Green Screen I, II or III	$18.95
Head Cleaning Kit	$24.95
Drive Numbering Tabs (pkg 0-3)	$4.50
5¼" Flip-N-File	$24.95
8" Flip-N-File	$39.95

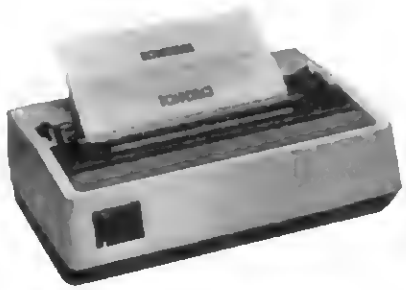
— LOWER PRICES



Percom's Proven DOUBLER II†

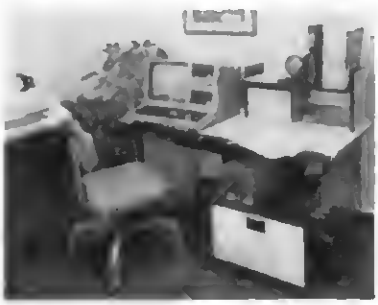
Upgrade Your Model I to Double Density for only $159.95

And not with some unproven hacker's kit, either. But with an assembled and fully tested *Percom DOUBLER-II†*. The DOUBLER II† simply plugs into the disk drive controller socket of your Expansion Interface. Then it lets you store over four times more on one side of a diskette, depending on the drive, than you can store on standard Tandy Model I drives. Other features: • Reads, writes and formats *either* single- or double-density • Includes DBLDOS™, a TRSDOS* compatible disk-operating system • Runs TRSDOS*, NEWDOS††, Percom OS-80† and other single-density software immediately. Change to double-density operation when convenient • Use Move 1-2-3 utility ($29.95) or other appropriate software to read Model III programs on your Model I. • Includes on-card high-performance data separation and write precompensation circuitry.



Clear-Out Sale on Microline-80 Printers!

only **$379**



Low Cost System Furniture

Modular design permits custom arrangements • Furniture styling and quality • TRS-80* colors • OK for UPS shipping • Reassemble without tools

System desks from $115
Printer stands from 5144

Arrick Products Quick-Switch‡

Just flick a switch to connect your TRS-80* printer port from device #1 to device #2. Or, "Quick-Switch" a peripheral between computers. Versions for RS-232 or Centronics interfacing. Includes box-mounted 34-pin card-edge plugs. From $89.95. Cables from $29.95.

‡ trademark of Arrick Products Company.

Save! Make ACCESS your one-call shopping center for TRS-80* hardware and software. Call our toll-free order number for free product literature and latest prices. **Ask for our new, free software catalog.**

Toll-Free Order No.

1-800-527-3475◇

(orders & literature only)

ACCESS UNLIMITED

401 N. Central Expressway #600
Richardson, Texas 75080
(214) 340-5366

* Trademark of Access Unlimited
† Trademark of Percom Data Company, Inc.

*Trademark of Tandy Radio Shack Corporation
**Trademark of Apple Computer Corporation

See List of Advertisers on page 330

LOAD 80

Games don't have to be complicated to be fun.

Cram

Hardin Brothers
280 North Campus Ave.
Upland, CA 91786

CRAM came from my experiments in using the INKEY$ and Set...Reset Functions. Cram has become the most popular game in my library.

Why? It is easy to play. Games usually last less than a minute. The computer does not let you quit. As soon as one game is finished, the next one starts. Playing only one game of Cram is like trying to eat just one potato chip. Cram is a skill game that does not require the usual multi-fingered coordination of so many skill games. Cram can be be played solitaire or against as many other players as you like.

The Rules

The computer, using Set graphics, generates a moving line. To change the line's direction push any key except shift. The line then turns a 90 degree angle and continues.

If you wait too long to change direction the line runs into itself ending the game. You are given one point for each corner turned.

Wait as long as possible before changing the line's direction to leave as much space as possible for future moves.

The Program

You can skip the title and instructions by omitting lines 130 and 680-910. Program Listing 1 is the original stripped down program. All variables are defined as integers in line 120 to increase program speed. The opening title screen and instructions subroutine start at line 130. Line 140 initializes the three variables used in the main program loop and line 160 calls a subroutine to set the playing board boundaries.

Starting with line 109, there are four similar blocks of instructions comprising the main program loop. To move right, the row index (I) is incremented to point to the next pixel. Then a test is made to determine if the line will collide with a previously drawn line. If so, the program jumps to the end game and score routine. If not, the next pixel is set and the keyboard is scanned by INKEY$ to determine if a key has been pressed. If there has been no keystroke, the program flow jumps backwards to set the next point to the right. If there has been a keystroke, the score counter is incremented and program flow moves on to the move down routine.

The move down, move left and move up routines are almost identical to the move right routine, except for the initial statement in each determining whether the row or column index is incremented or decremented.

The move routines could have been made into a common subroutine. But this would slow down the game to allow the computer to search for the appropriete line numbers.

To speed up the game, take out all REMarks and spaces in the main program loop and condense each move routine to a single line.

Adding Sound

Program Listing 2 includes a short Assembly language routine to generate sounds for Cram. Program Listing 3 is the complete, fully enhanced Cram.

The source code in Listing 2 is similar to many other sound generating programs. A value from the Basic USR command is loaded into HL by the instruction Call 0A7FH. This value is a combination of two bytes controlling the pitch (frequency) of the tone to be produced and its duration. These values are decoded and used to toggle the 0FFH port (the cassette port) to create sounds.

I translated the object code from the hex notation created by EDTASM into standard decimal numbers and used those for the data statements in lines 1030-1050 in Listing 3. Line 930 sets up a dummy string, AA$, to hold the machine language program. Lines 940-1020 POKE the necessary values into the string.

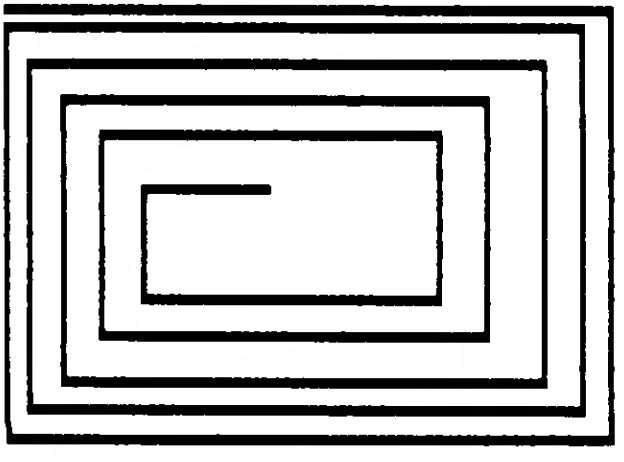


Fig. 1. Cram game in progress

The Key Box

Basic Level II
Models I and III
16K RAM

LYNN'S A/R SYSTEM

12 Intergraded Account Receivable Programs Tested In Service For Over 3 Years

User's Comments: • menu driven • increased cash flow • saved over 50 hours a month in secretarial hours • almost completely eliminated billing errors • phone supported-ask for Ron

LYNN'S A/R SYSTEM WILL

- print invoices
- tell you your a/r total, number of invoices outstanding, average per invoice
- tell you at any time how many invoices an individual account has open, the total amount owed, the average per invoice, the invoice date, and then invoice amount
- total sales on account for a given month, number of invoices sent, avarage sale per invoice
- how much an account purchased during month, how many invoices were sent, average invoice for month
- tell you what percent of sales an account is to total sales by month
- tell you what percent of a/r an account is
- print mailing labels for your accounts
- print statements at any time you want them (either individual or all accounts)
- print alphabetical hardcopy of accounts and account numbers
- print all items sold for month
- alphabetical sort of items sold by month
- this set of programs can be custom modified by you or us
- AND MUCH MORE!!

AGING REPORT FOR LYNN'S A/R SYSTEM

Aging Report 01/31/82 Page 1

Account	Current	30-60 Days	60-90 Days	90+ Days	Total
ABC Inc.	$ 249 00	$ 65 20	$ 00 00	$ 00 00	$ 314 20
Old Co. Inc.	00 00	84 40	165 20	00 00	249 60
New Co. Inc.	97 75	00 00	00 00	00 00	97 75
Deadbeat Inc.	00 00	00 00	00 00	345 00	345 00
Totals	$346 75	$ 149 60	165 20	345 00	$ 1,006 55

Aging reports can be compiled on a daily, weekly or monthly bases.

LYNN'S CHECKBOOK LEDGER SYSTEM

•Phone Supported Ask For Ron•

• saves hours of posting to general ledger • almost completely eliminates mathematical errors • menu driven • 200 expense fields • will handle 1,000 checks a month • will print checks with option to enter handwritten checks • will do reconciliation statement with hardcopy • will print hardcopy of field totals both by month, year to date and end of year • automatic account numbering • automatic field entry • will print hardcopy of checkbook register • debit and credit memo entry • alphabetical hardcopy of accounts payable and account numbers (machine language sort, very fast) • AND MUCH MORE! •

DATA BASE MANAGER BY WELLS

perfect tool for storing and maintaining mailing list, inventories, menus, collection records, article references, important dates, client records • all functions menu driven • easy to interface to word processors and communication programs • sort in ascending or descending order (fast machine language sort) • compact storage with minimum overhead • go from data base to visicalc and return • sort and select visicalc lines!!• interface to Radio Shack's "advanced statistical package".

LYNN'S

Account Receivable System	$49.95
Account Receivable Aging Report	$20.00
Checkbook Ledger System	$69.95
Well's Data Base Manager	$39.95

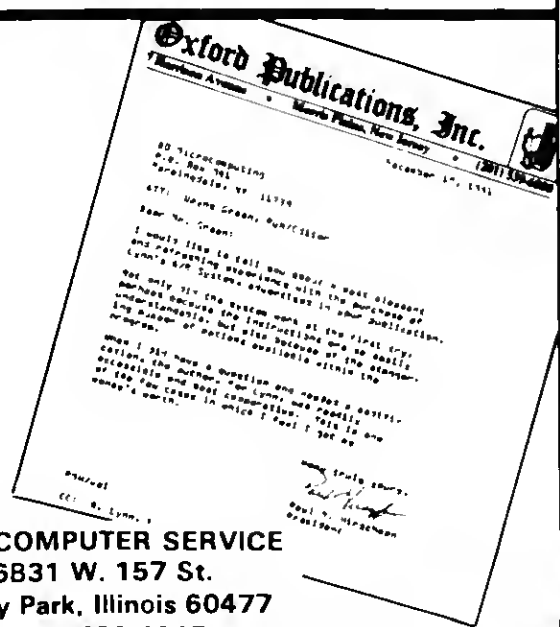
Add $2.00 Freight and Handling

Illinois Residents Add 6% Sales Tax

Send $10.00 Per System
For Printouts and Documentation.
Credit Given on Order

Equipment Needed: 48K Model I or III, Lineprinter, 2 Disk Drives.

The above programs will work on TRSDOS 1.2 and 1.3 for the Model III. NEWDOS, NEWDOS80, NEWDOS80 V2.0, LDOS and MULTIDOS for the Model I and III.



LYNN COMPUTER SERVICE
6831 W. 157 St.
Tinley Park, Illinois 60477
(312) 429-1915

↙115

TRS80 and TRSDOS are trademarks of TANDY CORP NEWDOS and NEWDOS80 are trademarks of APPARAT INC LDOS is a trademark of LOGICAL SYSTEMS INC

↙See List of Advertisers on page 338

CENTRONICS 779/RS LINE PRINTER I

MAKE YOUR PRINTER A REAL WORKHORSE WITH OUR NEW PRINTER CONTROLLER BOARD

Remove the controller board in your printer and plug ours in to add the following capabilities:

- Bidirectional printing
- Full UPPER/lower case ASCII *plus* TRS-80 graphics or DSE scientifics character sets in 9 x 7 dot matrix format (9 x 9 available as option — requires print head change)
- Motor control — turns off the motor when the printer is not in use
- 2048 character buffer
- Software selectable features
  - transfer protocol (XON/XOFF or none)
  - character densities (10, 12, 15, 16.5 cpi *plus* double width in each size)
  - self-test
  - forms, length, control

$350 assembled and tested

Radix Technologies

Suite 400 Carolyn Building
10400 Eaton Place
Fairfax, VA 22030 **(703) 385-0900**

VISA, MasterCard, check, COD accepted 269

(For more information on how to pack strings with machine language accessible from USR, see Bill Barden's *Programming Techniques for Level II Basic* or Louis Rosenfelder's *Basic Faster and Better & Other Mysteries*.)

Lines added throughout the program accommodate sound in the title, main loop and end game sections. Each time the program wants a tone it uses the USR() command and includes a value to determine the tone's frequency and duration.

To add the sound routines to the Listing 1 version add lines 110, 240, 310, 380, 450, 630-650, 720, 760 and 920-1230. Also modify lines 580 and 680-700.

With Disk Basic, line 100 will improve the quality of sound and line 960 will work as listed. If you use Level II Basic, omit line 100 and change line 960 as shown in the Remarks for lines 960-970.

Cram is as much fun as it is addictive. ■

Hardin Brothers teaches drama and English for the Chaffey High School District.

Program Listing 1. Level II Basic

```
1 ' **** C R A M ****
2 ' **** VERSION 1.1 ****
3 '                        WRITTEN BY HARDIN BROTHERS
4 '                                   280 NORTH CAMPUS AVE.
5 '                                   UPLAND, CALIFORNIA 91786
6 '
7 ' **  THIS IS THE SIMPLEST VERSION
8 '
9 '
120 DEFINT A - Z
130 GOSUB 680
140 C = 0 : I = 0 : J = 2 : REM *** C IS COUNTER FOR POINTS
150 '                                  I & J MARK CURSOR POSITION
160 GOSUB 580
170 '                                 **** MAIN PROGRAM LOOP ****
180 '*** MOVE RIGHT ***
190 I = I + 1
200 IF POINT(I,J) THEN 590
210 SET(I,J)
220 IF INKEY$="" THEN 190
230 C = C + 1
250 '*** MOVE DOWN ***
260 J = J + 1
270 IF POINT(I,J) THEN 590
280 SET(I,J)
290 IF INKEY$="" THEN 260
300 C = C + 1
320 '*** MOVE LEFT ***
330 I = I - 1
340 IF POINT(I,J) THEN 590
350 SET(I,J)
360 IF INKEY$="" THEN 330
370 C = C + 1
390 '*** MOVE UP ***
400 J = J - 1
410 IF POINT(I,J) THEN 590
420 SET(I,J)
430 IF INKEY$="" THEN 400
440 C = C + 1
460 GOTO 190
480 '
490 '                                 **** SET SCREEN BORDER ****
500 CLS
510 FOR A=0 TO 127 : SET (A,0) : NEXT A
520 FOR A = 0 TO 47 : SET (127,A) : NEXT A
530 FOR A = 127 TO 0 STEP -1 : SET (A,47) : NEXT A
540 FOR A = 47 TO 2 STEP -1 : SET (0,A) : NEXT A
550 A$ = INKEY$
560 RETURN
570 '                                 **** END GAME & SHOW SCORE ****
580 '
590 IF C<10 THEN B$="! " ELSE B$ = "!"
600 PRINT@ 476, B$ ; C ; " !";
610 IF C=1 THEN C$ = "TURN " ELSE C$="TURNS"
620 PRINT@ 548, "!"; C$ ; "!";
660 FOR A = 1 TO 1500 : NEXT : GOTO 140
670 '                                 **** TITLE SCREEN & INSTRUCTIONS
****
680 CLS : PRINT CHR$(23);
690 FOR A = 1 TO 15
700   PRINT TAB(3+A) "CRAM"
710 NEXT A
730 FOR B = 1 TO 1500 : NEXT B
740 CLS
750 PRINT TAB(8) "WELCOME TO THE GAME OF 'CRAM'"
770 PRINT : PRINT "DO YOU WANT INSTRUCTIONS?"
780 A$ = INKEY$ : IF A$ = "" THEN 780
790 IF A$ = "N" THEN 900
800 IF A$ <> "Y" THEN 780
810 PRINT : PRINT TAB(8) "THE OBJECT OF THE GAME IS TO CRAM AS M
ANY"
820 PRINT "LINES AS YOU CAN ONTO THE SCREEN.  EACH TIME YOU"
830 PRINT "WISH TO CHANGE THE DIRECTION OF THE MOVING LINE,"
840 PRINT "PRESS ANY KEY EXCEPT <SHIFT> OR <BREAK>."
850 PRINT TAB(8) "THE GAME IS OVER WHEN THE MOVING LINE RUNS INT
O"
```

Listing 1 continues

SECURE PROGRAMS

AND ASCII FILES
WITH
CODE 4

COMES WITH
LIST SOURCE
AND BRUN UTILITY

$19.95

SEND CHECK OR
MONEY ORDER TO

HPB VECTOR

130 CENTER ST.
EAST STROUDSBURG
PENNSYLVANIA 18301

ALLOW TWO WEEKS DELIVERY

Computers & Gambling Products Magazine

SEND FOR FREE CATALOG

Beat Roulette with a Pocket Computer!
This booklet by Dr Edward O Thorp describes his little known work on Physical Prediction of Roulette The man who made Las Vegas change the rules on BlackJack exposes Roulette's succeptibility to computers **$ 9.95**

Horse Race Handicapping! Our biggest seller — Probability Handicapping Device-1 This is a comprehensive horse racing system for spotting overlays in thoroughbred sprint races Easy entry of data from the racing form A complete users manual takes you step by step through a sample race and explains overlay betting and money management The user s manual contains a detailed lab run of a 100 consecutive race system workout showing an amazing $1 50 returned for each $1 00 wagered (Note, this is not the same program as "Winning at the Races ") You may purchase the manual seperately for $7 95 and credit PHD-1 is now available for CP/M (Basic-80, M-Basic). PHD-1 User's Manual and cassette for:

16K Apple II Applesoft, 8K Ohio Scientific (specify 1P or 4P), 16K TRS-80 Model I or III	$29.95
Apple or TRS-80 Disk	$34.95
CP/M 8" Single Density Data Disk	$39.95

DR. QUIRIN'S FAMOUS DISCOVERIES!
Win at the Races. This is the program using the algorithms from Dr Quirin s book Highly praised and endorsed by DR QUIRIN this program is the best available today Screen edit data entry makes entering data a breeze Dr Quirin s par time adjustment routines are included We warned you that the price would go up and it did Order now because this price will go up again

Winning At the Races Cassette (32K TRS-80 or Apple)	$49.95
Disk	$49.95

Winning at the Races — the book by William Quirin Ph D This is the best computerized study of thoroughbred racing ever published This 300 page hardbound book shows detailed studies of high impact value factors and includes Dr Quirin s famous Par Times
A Tom Ainsle Winners Circle Book **$21.95**

Beating the Races with a Computer by Steve Brecher A good How To book on multiple regression techniques applied to Pari Mutuel handicapping Some heavy math **$14.95**

Make checks payable to JOE COMPUTER Phone orders and information (213) 992 0514
Send to JOE COMPUTER 22710 Ventura Blvd Suite F Woodland Hills CA 91364
California residents add 6% sales tax

VISA

256

HARD DISK SUPPORT RACET computes ■ HARD DISK SUPPORT RACET computes ■ HARD DISK SUPPORT RACET computes ■ HARD DISK SUPPORT RACET computes ■ HARD DISK SUPPORT

FIELD PROVEN

5 to 140 MEGABYTES On Line for the TRS-80* Model II
Winchester and Cartridge Disk Drives available for immediate delivery!!
5 MEGABYTE Winchester Disk Drive — CALL for PRICING
LOWEST PRICES AVAILABLE ANYWHERE!!

14+ Megabyte (formatted) ARM Winchester Disk Drive **$3895**
Includes ECC error detection and correction. **FAST.** Service Contract Available ($30/month/drive).

20 Megabyte CII Honeywell Bull Cartridge Drive **$7995**
10 Megabytes fixed, 10 removable for the professional installation requiring Removable Media BACKUP. 60 and 120 Megabyte add-on Winchester drives available.

10 Megabyte Cameo - Western Dynex Cartridge Drive **$5995**
5 Megabytes fixed, 5 removable for the smaller professional installation. Removable Media BACKUP. Multiplexer available for up to four users!!

HARD / SOFT DISK SYSTEM (HSDS) SOFTWARE

HSDS is available for the **Radio Shack (2.0{A} compatible)**, Cameo, Cynthia Bull, ARM, Corvus, DCS, Data Peripherals, and Santa Clara Systems hard disk systems and others!!!

Compatible with your Version 2.0(a) TRSDOS files. Compatible with your existing BASIC programs and files. Compatible with most machine language programs that use the standard calling sequence. You can access **both** your floppy disk drives and HSDS files **interchangeably!!** Complete utilities include HZAP (Hard Disk SUPERZAP), Directory Catalog System, Parameterized FORMAT, HPURGE (Bulk Copy/Purge Utility) and others.

The Hard/Soft Disk System (HSDS) Software has more than One Year's FIELD Experience. The latest HSDS version adds several enhancements including mainfenance of system files on the hard drive, files as large as the disk, the ability to segment the disk as logical drives, and definable directory size. Uses 3.2K memory. Mixed floppy and hard drive operation is supported.

HSDS for Radio Shack $500
HSDS for Other Drives $400

RACET COMPUTES LTD.
Integrity in Software

1330 N. Glassell, Suite M, Orange, CA 92667 (714) 997-4950

CALL FOR COMPETITIVE PRICING ON HARD DRIVE SUBSYSTEMS — BUY WHERE YOU CAN GET SOFTWARE SUPPORT!!
CHECK, VISA, M/C. C.O.D. ON CERTAIN HARDWARE
TELEPHONE ORDERS ACCEPTED (714) 997-4950

41

*TRS 80 IS A REGISTERED TRADEMARK OF TANDY CORPORATION

CIRCLE READER RESPONSE FOR FREE CATALOG

See List of Advertisers on page 338

BIS Bayesian Investment Services

Send $1.00 for instructive catalog with sample output of TRS-80* investor programs written by economist Dr. Richard Harriff of BIS.

Stock Timer™
Commodity Timer™
Option Valuator™
Convertible Valuator™
Portfolio Valuator™

Write or call:

BIS ↙183
757 Santa Rosita
Solana Beach, CA 92075
(714) 755-6225

*TRS-80 is a trademark of Tandy Corp.

TRS-80*

SAVE A BUNDLE

When you buy your TRS-80™ equipment!

Use our toll free number to check our price before you buy a TRS-80™ . . . anywhere!

TRS-80 is a trademark of the Radio Shack Division of Tandy Corporation

Don't delay . . . CALL TODAY

HAB ↙189
SALES COMPANY
704 West Michigan
P.O. BOX 8098 PENSACOLA FL 32505
904/438-6607
nationwide 1-800-874-1551

Program Listing 1 Continued

```
860 PRINT "A PREVIOUSLY-DRAWN LINE.  AT THE END OF THE GAME I"
870 PRINT "WILL REPORT YOUR SCORE."
880 PRINT : PRINT TAB(8) "PRESS <ENTER> TO START THE GAME."
890 A$ = INKEY$ : IF A$ = "" THEN 890
900 CLS
910 RETURN
```

```
                00100 ;************************************
                00110 ;
                00120 ; SIMPLE, RELOCATABLE SOUND ROUTINE
                00130 ;  THAT CAN BE INTERFACED WITH 'CRAM'
                00140 ;  AND OTHER BASIC PROGRAMS
                00150 ;
                00160 ;************************************
                00170 ;
0000            00180           ORG     0000H       ;NO SPECIFIC ORIGIN NEEDED
0000 CD7F0A     00190           CALL    0A7FH       ;GET VALUE FROM USR CALL
0003 4C         00200           LD      C,H         ;GET HIGH BYTE INTO C
0004 45         00210 LOOP1     LD      B,L         ; AND LOW BYTE INTO B
0005 3E01       00220           LD      A,01H       ;TURN ON OUTPUT BIT
0007 D3FF       00230           OUT     (0FFH),A    ;AND SEND TO PORT
0009 10FE       00240 LOOP2     DJNZ    LOOP2       ;WAIT 1/2 CYCLE
000B 45         00250           LD      B,L         ;RELOAD WITH LOW BYTE
000C 3E10       00260           LD      A,10H       ;TOGGLE OUTPUT BIT
000E D3FF       00270           OUT     (0FFH),A    ;AND SEND TO PORT
0010 10FE       00280 LOOP3     DJNZ    LOOP3       ;WAIT 1/2 CYCLE
0012 0D         00290           DEC     C           ;DROP DURATION COUNT
0013 20EF       00300           JR      NZ,LOOP1    ;GO BACK UNTIL DONE
0015 C9         00310           RET                 ;THEN RETURN TO BASIC
0000            00320           END
```

Program Listing 2. Assembly language Sound routine. . .

Program Listing 3. Level II Basic with sound

```
1 ' ****  C R A M  ****
2 ' **** VERSION 2.1 ****
3 '                        WRITTEN BY HARDIN BROTHERS
4 '                                   200 NORTH CAMPUS AVE.
5 '                                   UPLAND, CALIFORNIA 91786
6 '
7 ' **  THIS IS THE ENHANCED VERSION
8 '
9 '
100 '
110 GOSUB 920
120 DEFINT A - Z
130 GOSUB 680
140 C = 0 : I = 0 : J = 2 : REM *** C IS COUNTER FOR POINTS
150 '                                  I & J MARK CURSOR POSITION
160 GOSUB 500
170 '                              ****  MAIN PROGRAM LOOP ****
180 '*** MOVE RIGHT ***
190 I = I + 1
200 IF POINT(I,J) THEN 590
210 SET(I,J)
220 IF INKEY$="" THEN 190
230 C = C + 1
240 X = USR(0305)
250 '*** MOVE DOWN ***
260 J = J + 1
270 IF POINT(I,J) THEN 590
280 SET(I,J)
290 IF INKEY$="" THEN 260
300 C = C + 1
310 X = USR(0319)
320 '*** MOVE LEFT ***
330 I = I - 1
340 IF POINT(I,J) THEN 590
350 SET(I,J)
360 IF INKEY$="" THEN 330
370 C = C + 1
380 X = USR(0343)
390 '*** MOVE UP ***
400 J = J - 1
410 IF POINT(I,J) THEN 590
420 SET(I,J)
```

Program Listing 3 Continues

Program Listing 3 Continued

```
430 IF INKEY$="" THEN 400
440 C = C + 1
450 X = USR(8335)
460 GOTO 190
480 '
490 '                              **** SET SCREEN BORDER ****
500 CLS
510 FOR A=0 TO 127 : SET (A,0) : NEXT A
520 FOR A = 0 TO 47 : SET (127,A) : NEXT A
530 FOR A = 127 TO 0 STEP -1 : SET (A,47) : NEXT A
540 FOR A = 47 TO 2 STEP -1 : SET (0,A) : NEXT A
550 A$ = INKEY$
560 RETURN
570 '                              **** END GAME & SHOW SCORE ****
580 '
590 GOSUB 1060 : IF C<10 THEN B$="I " ELSE B$ = "1"
600 PRINT@ 476, B$ ; C ; " !";
610 IF C=1 THEN C$ = "TURN " ELSE C$="TURNS"
620 PRINT@ 540, "I"; C$ ; "!";
630 IF C>20 THEN GOSUB 1130
640 IF C>30 THEN GOSUB 1130
650 IF C>30 THEN GOSUB 1130 : GOSUB 1130
660 FOR A = 1 TO 1500 : NEXT : GOTO 140
670 '                              **** TITLE SCREEN & INSTRUCTIONS
****
680 CLS
690 FOR A = 1 TO 15
700   PRINT TAB(6+A*2) "C R A M"
710 NEXT A
720 GOSUB 1060 : GOSUB 1060 : PRINT CHR$(23);
730 FOR B = 1 TO 1500 : NEXT B
740 CLS
750 PRINT TAB(8) "NELCOME TO THE GAME OF 'CRAM'"
760 PRINT TAB(8) "PLEASE CONNECT YOUR AMP/SPEAKER"
770 PRINT : PRINT "DO YOU WANT INSTRUCTIONS?"
780 A$ = INKEY$ : IF A$ = "" THEN 780
790 IF A$ = "N" THEN 900
800 IF A$ <> "Y" THEN 780
810 PRINT : PRINT TAB(0) "THE OBJECT OF THE GAME IS TO CRAM AS M
ANY"
820 PRINT "LINES AS YOU CAN ONTO THE SCREEN.  EACH TIME YOU"
830 PRINT "WISH TO CHANGE THE DIRECTION OF THE MOVING LINE,"
840 PRINT "PRESS ANY KEY EXCEPT <SHIFT> OR <BREAK>."
850 PRINT TAB(0) "THE GAME IS OVER WHEN THE MOVING LINE RUNS INT
O"
860 PRINT "A PREVIOUSLY-DRAWN LINE.  AT THE END OF THE GAME I"
870 PRINT "WILL REPORT YOUR SCORE."
880 PRINT : PRINT TAB(0) "PRESS <ENTER> TO START THE GAME."
890 A$ = INKEY$ : IF A$ = "" THEN 890
900 CLS
910 RETURN
920 '                              **** SOUND ROUTINES ****
930 AA$="                          " : REM ** 22 SPACES
940 QA! = VARPTR (AA$)
950 QB! = PEEK(QA!+1) + PEEK(QA!+2) * 256
960 POKE 16526,PEEK(QA!+1) : POKE 16527, PEEK(QA!+2)
970 '            ** FOR DISK BASIC, CHANGE 960 TO DEFUSR = QB!
980 FOR A! = QB! TO QB! + 21
990   B! = A! : IF B! > 32767 THEN B! = B! - 65536
1000   READ Q : POKE B!,Q
1010 NEXT A
1020 RETURN
1030 DATA 205, 127,  10,  76,  69,  62,   1
1040 DATA 211, 255,  16, 254,  69,  62,  16
1050 DATA 211, 255,  16, 254,  13,  32, 239, 201
1060 FOR A = 1 TO 3
1070   X = USR(8319)
1080   X = USR(8343)
1090   X = USR(8335)
1100   X = USR(8305)
1110 NEXT A
1120 RETURN
1130 X = USR(32303)
1140 X = USR(32303)
1150 X = USR(14479)
1160 X = USR(13719)
1170 X = USR(27207)
1180 X = USR(12966)
1190 X = USR(13719)
1200 X = USR(27207)
1210 X = USR(27207)
1220 X = USR(27207)
1230 RETURN
```


Electronic Circuit Analysis

- Detailed analog circuit analysis
- DC and AC analysis
- Very fast, machine language
- Infinite circuits on multiple passes
- Worst case analysis
- Dynamic modification
- 64 Nodes
- Compare circuits
- Log or linear sweep
- Full file handling
- Frequency response, magnitude and phase
- Complete manual with examples
- A truly professional program with features previously available only on large systems
- Available soon for CP/M
- Available now for TRS-80 disk 575.00

Tatum Labs
P.O. Box 722
Hawleyville, CT 06440
(203) 426-2184

Dos helper

- The features your dos doesn't have
- Fast ram spooler
- Type ahead
- Route to disk
- Compare files
- File format conversions
  - Add and drop line numbers
  - Word processor to EDTASM
  - Unpack Basic programs
- Append object files
- Model III TRSDOS directory
- Neat listing of packed Basic programs
- Designed for Newdos80. Works with any dos
- Only $19.95
- TRS-80 Model I or Model III disk

TRS-80 is a trademark of Tandy Corp

263

See List of Advertisers on page 338

Team up with micro to create puzzles.

Acrostic Generator

Jonathan Falk
4105 Yale Station
New Haven, CT 06520

This double-acrostic program will not help you solve puzzles, but it will greatly simplify the task of making and printing one.

In double-acrostics, definitions are given like those in a regular crossword puzzle. Each letter in the definition is coded to spell out a message in the accompanying diagram. In Fig. 1, clue A, "Fog at Radio Shack Headquarters," has the answer "FORTWORTHMIST." The W in Worth is coded to Box 28 in the diagram. To solve acrostics work up from the definitions and down from the context of the message. In addition, the first letters of each definition spell out the author's name and title of the work. In this short example, only the author's name appears.

I tried composing a puzzle in my unenlightened pre-computer days. It was a disaster. The composition algorithm was simple, but execution was hopelessly error-prone.

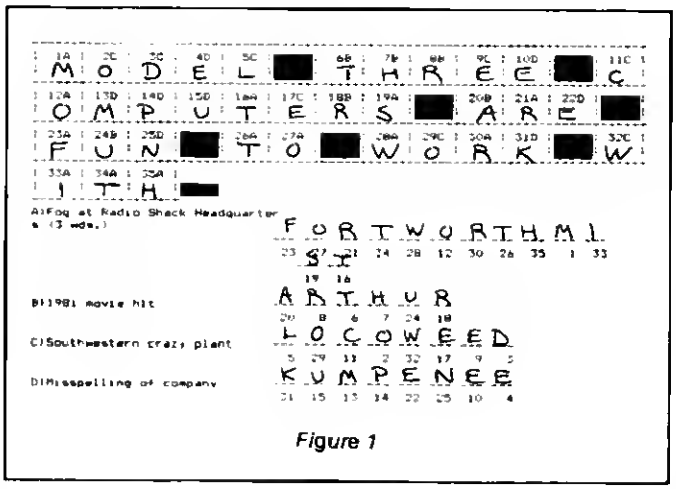


Figure 1

```
IF MESSAGE IS INCORRECT, HIT N>
LETTER      OCCURENCES      LETTER      OCCURENCES
A                1              N              1
B                0              O              4
C                1              P              1
D                1              Q              0
E                5              R              4
F                1              S              1
G                0              T              4
H                2              U              2
I                1              V              0
J                0              W              2
K                1              X              0
L                1              Y              0
M                2              Z              0
TITLE? .

IF MESSAGE IS INCORRECT, HIT N>
LETTER      OCCURENCES      LETTER      OCCURENCES
A                1              N              1
B                0              O              4
C                1              P              1
D                1              Q              0
E                5              R              4
F                1              S              1
G                0              T              4
H                2              U              2
I                1              V              0
J                0              W              2
K                1              X              0
L                1              Y              0
M                2              Z              0
TITLE? FALK
```

Fig. 2. Frequency Table

- Find a humorous message between 180 and 220 letters.
- Construct a table of how many times each letter appears.
- Find a title compatible with the table.
- Try out words, subtracting them from the table if they fit.
- Keep adding or subtracting words until all the letters are used.
- Assign each letter of the message to a definition letter.
- Write up the results.

This procedure consumed huge amounts of time and paper. I would get almost to the end and discover I had a T that could not be accounted for anywhere!

Now with my Model III, all the steps except the first are done by the computer quickly and without error.

How it Works

In Fig. 1 we are asked to input the message: "Model Three Computers are Fun to Work With." Do not use punctuation in the message. Your message can be no longer than 255 characters including blanks. You can input messages until the @ sign is encountered. After inputting, the message will appear on the screen for double-checking. Make sure it is exactly the right format for the answer, including spacing.

As a title I chose my name, Falk. The computer checks against the frequency table to make sure this title is available.

The Key Box

Basic Level II
Model I or III
16K RAM
Printer

Introducing the last Computer Supply Source You'll Ever Need.

Meet Data Supply Source. We're a vigorous new company, dedicated to meeting your computer supply needs efficiently. And at the lowest possible cost.

At Data Supply Source you'll find a full line of labels, forms and papers — both 15- and 20-pound standard stock — for business and personal use. If you prefer, we'll sell you easy-to-store half cases and mini-packs. We also have available NCR or carbon multi-leaf forms in a variety of styles and sizes. All at the lowest prices you'll find anywhere.

Compare this list with any other advertised prices:

Printer ribbons:
Epson Mx 80/70 . . . . . $8.95 each
Okidata 82/83 . . . . . $2.99 each

Mailing labels:
White pinfeed, qty. 5000. . . . $19.95

Paper, white, tractorfeed:
9½ x 11 #15 (3,300 shts.). . . . $29.95
9½ x 11 #20 (2,550 shts.). . . . $29.95
14 x 11 #15 (3,300 shts.) $39.95
14 x 11 #20 (2,550 shts.) $39.95

If you see a better price advertised for any of our products, let us know. We believe our prices are among the best available. So you simply can't save more on your computer supples than at Data Supply Source.

Service to match your savings.

Ordering from Data Supply Source is quick and convenient, too. Simply call one of our toll-free numbers. We'll honor your MasterCard, Visa, check or money order, or we'll send your order C.O.D. All bulk paper is shipped freight collect. Other orders go U.P.S. **For faster delivery, we recommend U.P.S. Blue Air Service.**

Call toll-free:
800/525-8394 or 800/525-8419.

Compare our selection, prices and service with any other supply company's. Then give us a call. You'll never do business with another computer supply source. Because you'll never need to.

DATA SUPPLY SOURCE
A Data Resources Company
304 Elati Street
Denver Colorado 80223

✓15

✓See List of Advertisers on page 338

The computer then prints the title-adjusted frequency table (Fig. 2). Now we have to come up with words beginning with F, A, L and K. After every command we are returned to the menu, which gives a choice of adding a word, subtracting a word, or listing the definition words or frequency table.

Suppose we tried to meke the F word Face. The program reports that we already used up our supply of As in the message (one was used in the title). When I try "FORTWORTHDEW", the program subtracts the letters "ORTWORTHDEW" from the frequency table (the F was subtracted as part of the title) and would prompt me with the menu.

Once the frequency table is finished, the command five from the menu begins the diagramming. This is apt to take some time for printout on long messages.

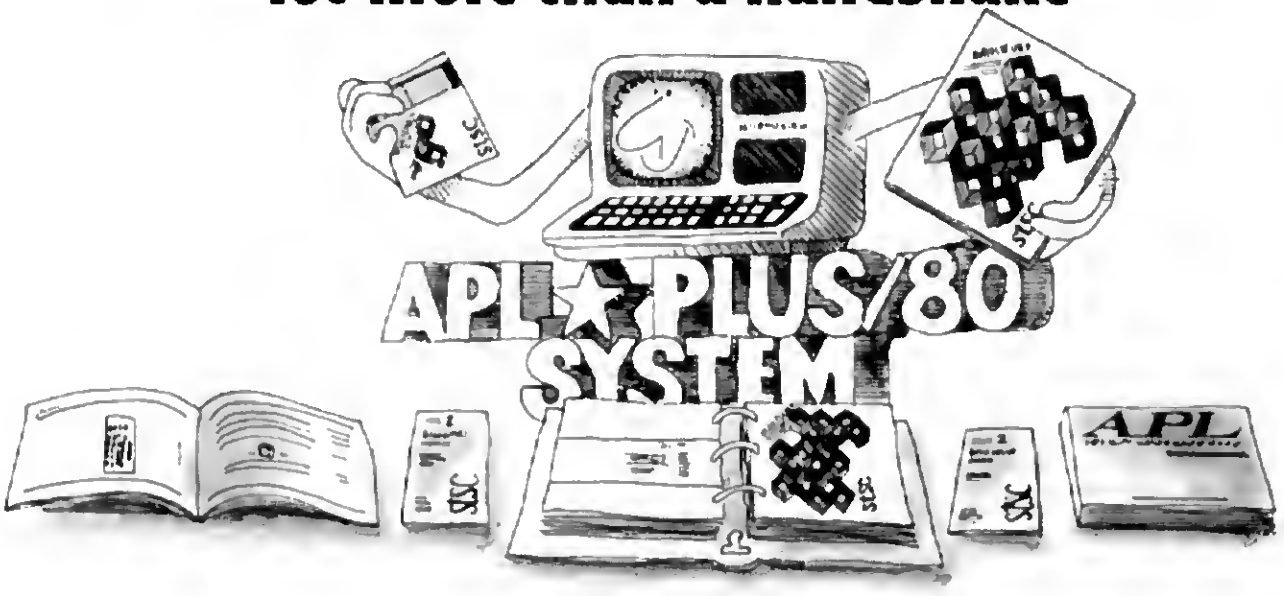
Program operation follows the algorithm pretty closely. T$(I) contains the Ith element of the message. T$ holds the title. P$() contains the message with all blanks removed. W$(I) contains the Ith definition. F is the frequency table. Thus F(0) is the number of As remaining, F(1) is the number of Bs remaining and so on. D$ holds the definition clues.

Fig. 3. Try this one out yourself

```
A)Tory opponents                --- --- --- --- ---
                                 80  58 144 100 150

B)A position at a distance from
shore
                                --- --- --- --- --- ---
                                134  94 135  26  14 146

C)A steak recipe                --- --- --- --- ---
                                 70 114 138 145 153

D)Insect studies                --- --- --- --- --- --- --- --- --- ---
                                  5 108   9 111  54 155 119  11  41 125

E)Poet and satirist             --- --- --- --- --- ---
                                151  13 117 116 136  42

F)Female gere cells             --- --- --- --- --- --- ---
                                  2 147  60 168 154 164 124

G)Unsuitable; unqualified       --- --- --- --- ---
                                161  12 156 101  82

H)Hissing                       --- --- --- --- --- --- --- ---
                                 63 118  88 158 139 130 103 131

I)Adding greater quality value o
r significance to
                                --- --- --- --- --- --- --- --- ---
                                 38  40 112  71  67  37  24  99  48

J)Genuine reliable or good (Angl
o-Indian)
                                --- --- --- --- ---
                                 28  46 120  97  75

K)A colloquial black eye        --- --- --- --- --- ---
                                 25  85  32 169  35  76

L)Pacify; appease               --- --- --- --- --- --- ---
                                 95  87 126 142  81 140 173

M)Medical apprentice (alt. sp.)--- --- --- --- --- --- ---
                                171 115  64  90  65 121  53

N)Cardinality of the faces of a
dodecahedron
                                --- --- --- --- --- ---
                                102  57  86  34   4  69

O)People pursuing an avocation --- --- --- --- --- --- --- --- ---
                                 16  45 160  20  23 127  73  51  30

P)Waggish; facetious            --- --- --- --- --- --- ---
                                 89 104  91  66  52 165   6

Q)Football-shaped               --- --- --- --- --- ---
                                 61  33 167  55  36 129

R)uncompleted; brought to ruin  --- --- --- --- --- ---
                                 19 159  79  93 133  49

S)Outcome of a division         --- --- --- --- ---
                                163 149  77 123 137

T)Disgustingly unclean; morally
filthy; obscene
                                --- --- --- --- ---
                                 62 141   7  68 120

U)Observant care; consideration;
 notice
```

Figure 3 continues

Our APL★PLUS®/80 System comes with a lot more than a handshake



All you get when you buy some software systems is a thin manual and a handshake for good luck. STSC's APL*PLUS/80 System is different. We give you a set of documentation that's so complete you won't need to read another thing to develop and run solutions on your TRS-80® Model III.

We know that our APL*PLUS/80 System can improve your productivity—if you know how to use its power. We start you off with a beginner's operation guide, if you're new to APL and to the TRS-80, and a beginner's tutorial, if you're familiar with the TRS-80 but not with the language. Then we include the most widely used APL textbook, so that once you get a taste for APL, you can study it in detail.

Challenge to BASIC

Build a data file with 15 records of 21 random numbers between 1 and 100 chosen without duplicates (in a record) and arranged in tables with 3 rows and 7 columns. Write a subroutine that reads a specified record and prints the table with row and column totals in fields 6 columns wide. Here is an APL solution:

```
     ∇ RANDOMTABLES;I
[1]    'RTABLES' ⎕FCREATE 10 ◇ I←1
[2]   L:(3 7⍴21?100)⎕FAPPEND 10 ◇ →(15≥I←I+1)⍴L
     ∇
     ∇ SHOWTABLE N;M
[1]    'I6' ⎕FMT M,[1]+/[1]M←N,+/M←⎕FREAD 10,N
     ∇
       RANDOMTABLES ◇ SHOWTABLE 12
    89     1    45    30    84    50   100    77   399
    52     8    93    13    99    40    77   382
    14    69    29    96     3    44    68   323
   155    78   167   139   186   134   245  1104
```

Here's your complete documentation package:

- Introduction to the APL*PLUS/80 System.
- Product Overview: APL*PLUS Systems.
- *APL*PLUS/80 Computer Operation User's Guide.*
- *APL is Easy!*
- *APL: An Interactive Approach*, Leonard Gilman and Allen J. Rose (Wiley, 1974).
- *APL*PLUS/80 Formatting User's Guide.*
- *APL*PLUS/80 Shared Files User's Guide.*
- *APL*PLUS/80 Programmer's Reference Manual.*
- Two APL*PLUS/80 Reference Cards.

We don't want to scare you away with our extensive documentation. You don't need to read all the manuals to write useful applications in APL, because APL is easy. APL is also fun and we're sure that when you know a little APL, you'll want to know a whole lot more—and *that's* why we're giving you the most complete set of documentation on the market.

If you'd like to use APL on your TRS-80 Model III to develop and deliver solutions faster and better for yourself or for your clients, send for the APL*PLUS/80 Application Development System. Mail in the coupon with your payment and we'll send you everything you need to run APL on your TRS-80 right away. If you'd like more details, check the box on the coupon and we'll send you our free information package which includes a detailed explanation of the Challenge to BASIC.

We're STSC, Inc., the leading supplier of APL software and services in the United States. Our APL*PLUS systems have been serving the business and professional world for more than 12 years.

APL*PLUS/80 runs under TRSDOS® 1.3 or LDOS® 5.1 on a 48K RAM TRS-80 Model III with two disk drives. The APL*PLUS/80 System comes with a custom APL-character ROM and a self-adhesive keyboard label set to convert your TRS-80 to the APL character set.

stsc ✓266

Attn: APL*PLUS/80 Distribution
STSC, Inc., 2115 East Jefferson Street
Rockville, Maryland 20852 (301) 984-5000 (orders only)

Yes, send me the APL*PLUS/80 System, postpaid.
☐ My check for $295 is enclosed. *Add sales tax where applicable.
☐ Charge my MasterCard Account # _____
Bank # _____
☐ Charge my VISA Account # _____
Expiration date: _____
*State sales tax applicable in MD (5%), FL (4%), and CT (7½%).

I'd like to know more about the APL*PLUS/80 System.
☐ Send me your free information package.

Name _____
Address _____
_____
City _____ State _____ Zip _____
Phone (_____) _____

80-882

APL*PLUS is a service mark and trademark of STSC, Inc., registered in the United States Patent and Trademark Office.
TRS-80 and TRSDOS are registered trademarks of Tandy Corporation. LDOS is a registered trademark of Logical Systems Corporation.

✓See List of Advertisers on page 338

Figure 3 continued

```
                                  --- --- --- --- --- --- --- --- ---
                                   96 157  15 152  50  74  10 109 148

V)Nuts; wacko                     --- --- --- --- ---
                                  166  29 122  56 107

W)Chang and Eng e.g.?             --- --- --- --- --- --- --- --- --- --- ---
                                  105 113  78   3  72  39   1   8 143 110  21
                                      --- --- ---
                                       44  43 172

X)Equilibrium; stagnation         --- --- --- --- --- ---
                                   10 162  22  31  98  47

Y)Palatable; attractive or desir
able
                                  --- --- --- --- --- --- --- --- ---
                                   92 170  59  84  83 106 132  27  17
```

1W	2F	3W	4N	50	6P	7T	8W	9D	10U	11D	12G	
13E	14B		15U	160	17Y		18X	19R	20O	21W	22X	230
	241	25K		26B	27Y	28J	29V	300	31X	32K	330	34N
35K		360	37I	38I		39W	40I	41D	42E	43W	44W	450
46J	47X		48I	49R	50U	51O	52P	53M	540	550	56V	
57N	58A	59Y		60F	61D	62T	63H	64M	65M	66P	671	68T
69N	70C		71I	72W		730	74U	75J	76K	77S	78W	79R
	80A	81L	82G	83Y		84Y	85K	86N		87L	88H	89P
90M	91P	92Y		93R	948		95L	96U	97J	98X	99I	100A
	101G	102N		103H	104P	105W	106Y	107V		108D	109U	110W
	1110	112I	113W	114C	115M	116E	117E	118H	1190	120T		121M
122V	123S	124F	1250		126L	1270	128J	1290		130H		131H
132Y	133R		134B	135B		136E	137S	138C	139H		140L	141T
142L	143W	144A	145C	1468		147F	148U		149S		150A	151E
152U	153C	154F		1550	156G		157U	158H	159R		1600	161G
162X		163S	164F	165P	166V	1670	168F		169K	170Y	171M	172W
173L												

ANSWER:

```
CONVERSATION ON THE SUBWAY IS IMPOSSIBLE THE INGENIOUS GENTLEMAN WHO CONSTRUCTED
 IT STARTED WITH THE OBJECT OF MAKING IT NOISY NOT ORDINARILY NOISY LIKE A TON O
F COAL FALLING ON A SHEET OF TIN BUT REALLY NOISY
```

This program uses the graphics capabilities of the Epson MX-80 printer. The boxes are printed by the command in line 670 LPRINT STRING$(5,223). In the standard Epson mode, CHR$(223) is the same as CHR$(191) on video. If your printer has graphics capabilities, substitute whatever gives the full fill-in. If you do not have graphics capability, you might try using Xs by changing line 670 to read: . . . . STRING$(5,"X"). . . .

Good luck! ■

Jonathan Falk, a graduate student in Economics at Yale, is writing his doctoral dissertation on his Model III.

Program Listing

```
10 '******** Acrostic Generator ********
20 '******** Jonathan Falk       ********
30 '******** (c) 1982           ********
40 CLEAR 10000
50 DIM T$(400), P$(300), W$(40), F(26), G(26), B(80), D$(40), Q(
300)
60 ' ******** INPUT MODULE ********
70 ' INPUTS THE DESIRED ACROSTIC MESSAGE, PLACING THE MESSAGE IN
```

Program continues

Program continued

```
 T$(), WITHOUT BLANKS IN P$(), AND PLACING OCCURRENCES FOR EACH
LETTER IN F().
80 PRINT"INPUT TEXT, ALL CAPS, ENDING WITH @"
90 INPUT A$
100 FOR I=1 TO LEN(A$)
110 H$=MID$(A$,I,1): IF H$="@" THEN 150
120 T$(L)=H$: L=L+1
130 IF H$<>" " THEN P$(K)=H$: K=K+1: F(ASC(B$)-65)=F(ASC(H$)-65)
+1: NEXTI ELSE NEXTI
140 GOTO 80
150 PRINT"TEXT READS AS FOLLOWS: IF INCORRECT, START OVER"
 FORI=0TOL-1:PRINTT$(I);:NEXTI
170 PRINT
180 INPUT "IF MESSAGE IS INCORRECT, HIT N";H$:IF H$="N"GOTO40

190 PRINT"LETTER","OCCURENCES","LETTER","OCCURENCES"
200 B=0
210 GOSUB920
220 '******* TITLE INITIALIZATION
230 '      PUTS TITLE IN W$
240 'TESTS TITLE AGAINST FREQUENCY TABLE
250 INPUT "TITLE";T$
260 FOR I=1 TO LEN(T$)
270 H$=MID$(T$,I,1):IF H$=" " THEN NEXTI: GOTO 310
280 W$(B)=H$:B=B+1
290 G(ASC(B$)-65)=G(ASC(H$)-65)+1
300 NEXTI
310 FOR I=0TO25:IPG(I)<=F(I) THEN NEXTI:GOTO330
320 PRINT"TITLE HAS TOO MANY ";CHR$(I+65);"'S":FORJ=0TO25:G(J)=0
:NEXTJ:GOTO190
330 FORI=0TO 25:F(I)=F(I)-G(I):G(I)=0:NEXTI
340 PRINT"MENU---------- (1)UNUSED TABLE        (2)CLUE TABLE"
350 PRINT"               (3)DELETE WORD         (4)ADD WORD     (5
)DIAGRAM"
360 INPUT "COMMAND";N
370 ONNGOTO380  ,430  ,470  ,540  ,630
380 PRINT"LETTER","OCCURRENCES","LETTER","OCCURRENCES"
390 GOSUB920
400 INPUT"HIT <ENTER> TO CONTINUE";H$
410 GOTO340
420 '***** WORD TABLE SUBROUTINE
430 FORI=0TOB:PRINTW$(I);" ";:NEXTI
440 PRINT:INPUT"HIT <ENTER> TO CONTINUE";H$
450 GOTO340
460 '****** CHANGE WORD SUBROUTINE
470 INPUT"WHICH WORD";W$
480 FORJ=0TOB:IFW$<>W$(J)THENNEXTJ:PRINTW$;" NOT FOUND":GOTO340

490 FORI=2TOLEN(W$):G(ASC(MID$(W$,I,1))-65)=G(ASC(MID$(W$,I,1))-
65)+1:NEXTI
500 FORI=0TO25:F(I)=F(I)+G(I):G(I)=0:NEXTI
510 W$(J)=LEFT$(W$,1)
520 GOTO340
530 '***** ADD WORD SUBROUTINE
540 INPUT"INPUT WORD";W$
550 FORJ=0TOB:IFLEFT$(W$,1)=LEFT$(W$(J),1) AND LEN(W$(J))=1 THEN
 560  ELSE NEXTJ:PRINT"NO AVAILABLE WORD WITH THAT LETTER":GOTO5
40
560 FORI=2TOLEN(W$)
570 N$=MID$(W$,I,1):IFN$=" "THENNEXTI:GOTO590
580 G(ASC(N$)-65)=G(ASC(N$)-65)+1:NEXTI
590 FORI=0TO25:IFG(I)>F(I) PRINT"WORD HAS TOO MANY ";CHR$(I+65);
"'S":FORI1=0TO25:G(I1)=0:NEXTI1:GOTO340  ELSE NEXTI
600 FORI=0TO25:F(I)=F(I)-G(I):G(I)=0:NEXTI:W$(J)=W$
610 GOTO340
620 '*****CHECK FOR PUZZLE COMPLETE
630 FORI=0TO25:IFF(I)=0 NEXTI:GOSUB740  ELSE PRINT"PUZZLE NOT FI
NISHED":GOTO340
640 '******** PRINT ROUTINE
650 LPRINT STRING$(79,"-")
660   L=L-1:FORI=0TOL
670 N$=T$(I):IFN$=" "THENLPRINTTAB(M);CHR$(124);STRING$(5,223);:
M=M+6:B(M-6)=1:GOTO690
680 B(M)=0:I=I+1:LPRINTTAB(M);CHR$(124);:LPRINTUSING"###";Z;:LPR
INT CHR$(ASC(P$(I-1))-35);:M=M+6
690 IFM>72THENLPRINTTAB(78);CHR$(124):FORI1=0TO78STEP6:LPRINTTA
B(I1);CHR$(124);:GOSUB940  :NEXTI1:LPRINT:LPRINTSTRING$(79,"-"):
M=0:C=0
700 NEXTI
710 LPRINTTAB(M);CHR$(124):FORI1=0TOMSTEP6:LPRINTTAB(I1);CHR$(12
4);:GOSUB940  :NEXTII       :LPRINT:LPRINTSTRING$(M+1,"-")
720 GOTO820
730 '******* LETTER ASSIGNMENT ROUTINE
740 FORI=0TOB-1
750    FORJ=1TOLEN(W$(I))
760    Y=RND(K)-1:IFP$(Y)<>MID$(W$(I),J,I)THEN760
770 P$(Y)=CHR$(I+100)
780 Q(PP)=Y:PP=PP+1
790 NEXTJ,I
800 RETURN
810 '********DEFINITION INPUT ROUTINE
820 FORI=0TOB-1:PRINT"DEFINITION OF ";W$(I);:INPUTD$(I):NEXTI
830 II=0
840 IF LEN(D$(II))>30 THEN LPRINT CHR$(II+65)+")";:FOR HH=1 TO L
EN(D$(II)) STEP30:LPRINTMID$(D$(II),HH,30);:IF HH<LEN(D$(II)) TH
EN LPRINT:NEXTHH ELSENEXTHH ELSE LPRINT CHR$(II+65)+")";D$(II);
850 IFLEN(W$(II))>12 THEN880  ELSE LPRINTTAB(31);:FORJ=1TOLEN(W$
(II));LPRINT"--- ";:NEXTJ:LPRINT:LPRINTTAB(31);:FORJ=1TOLEN(W$(I
I));LPRINTUSING"###";Q(NN)+1;:NN=NN+1:LPRINT "";:NEXTJ
860 LPRINT:LPRINT:II=II+1:IFII<BTHEN840
870 END
880 HH=1
890 LPRINTTAB(33);:FORJ=1TO11:LPRINT"--- ";:NEXTJ:LPRINT:LPRINTT
AB(31);:FORJ=1TO11:LPRINTUSING"###";Q(NN)+1;:NN=NN+1:LPRINT "";:
NEXTJ:HH=HH+11
900    LPRINT:LPRINTTAB(34);:FORJ=1TOLEN(MID$(W$(II),HH,II)) :LP
RINT"--- ";:NEXTJ:LPRINT:LPRINTTAB(34);:FORJ=1TOLEN(MID$(W$(II),
HH,11));:LPRINTUSING"###";Q(NN)+1;:NN=NN+1:LPRINT "";:NEXTJ:IFLEN
(MID$(W$(II),HH,11))<11THEN850  ELSEHH=HH+11:GOTO900
910 '********FREQUENCY TABLE MODULE
920 FORI=0TO12:PRINTCHR$(I+65),F(I),CHR$(I+78),F(I+13)
930 NEXTI:RETURN
940 IFB(I1)<>1THENRETURN
950 LPRINTSTRING$(5,223);:RETURN
```


INNOVATION / QUALITY / SUPPORT
AT A REASONABLE PRICE

PIONEER SOFTWARE
1746 NORTH WEST 55TH. AVE. #204
LAUDERHILL, FLORIDA 33313
PHONE 1-(305)-739-2871

PIONEER tm

SCRIPTR

COMPARE FEATURES AND YOU'LL BUY SCRIPTR!!

NEW' GRAPHTRAX'-ITALICS-UNDERLINE-DOUBLE-EMP+JUSTIFY TEXT.
NEW' DIAL-A-PRINT - GET LETTER QUALITY BY REPRINTING LINES
1). ENTER/EXIT SCRIPSIT AT WILL WITHOUT LOSING TEXT BUF.
2). OUTPUT ANY CODE'(S) (0-255), DIRECT FROM THE TEXT.
3). LETTER COMMANDS CONTROL <ALL> MX-80 TYPE FONTS FROM
THE TEXT PLUS VAR-LINESPACING, FORMS, TABBING + MORE
4). WRITE FORM LETTERS AND INPUT DATA INTO REPORT FORMS
5). DISPLAY ONLY MODE, HELPS SHOW WHERE PAGES START/END.
6). EDIT MODE FOR ERRORS, CHANGES, GRAPHICS OR PAUSING.
7). PRINT OUT ANY PAGE OR PAGES IN THE TEXT BUFFER WITH
HEADERS, FOOTERS AND PAGE NUMBERS IN PLACE.
8). PRINT OUT FULL SCREEN PICTURE FILES MADE BY CRAYON''
9). 6 SAMPLE TEACHING PROGRAMS TO GET YOU STARTED.
10). 72 PAGE MANUAL, BOUND, INDEXED, PHOTO OFFSET PRINTED.
11). 2 VERSIONS INCLUDED WORK WITH ANY PARALLEL PRINTER.
NEW' MICROLINE-82A + PROWRITER + LP IV. + LP VIII.+ F-10
NEW' DAISY WHEEL 2 VER. ALLOWS SUB/SUPER SCRIPTING 10".12"
NEW' + PROPORTIONAL, UNDERLINING, 1 1/2 LINE SPACING, SLASH
NEW' ZERO'S, EMPHASIZED PRINTING, KB. ECHO, OVERSTRIKING.

MX-80 VER. WORKS WITH/WITHOUT GRAPHTRAX-MOVE UP ANY TIME'
DISK SCRIPTR MOD 1/3 - 449.00 MOD III, VERSION WORKS WITH
MODEL 1. SCRIPSIT/LC - NO USER PATCHING REQ. FOR MOD 1/3
CASSETTE SCRIPTR MOD 1/3 - 449.00 WORKS WITH REG. SCRIPS.
1.0 FOR MOD 1/3 REQ. 32K.+ LC/MOD SCRIPTR IS A 5.5A PROG.
SEND FOR OUR FREE BROCHURE THAT DEMONSTRATES ALL FEATURES
SCRIPTR IS WELL DOCUMENTED AND BUG FREE' CUSTOMER SUPPORT
SATURDAYS + EVENINGS FOR YOUR CONVENIENCE, FREE BROCHURE''

<<<< PLEASE INCLUDE THIS INFORMATION WHEN ORDERING >>>>
NAME _____ | MODEL 1 OR 3 _ | CASSETTE/DISK
ADDRESS _____ | TYPE PRINTER _ | SCRIPSIT VER 8.
CITY/STATE/ZIP/PHONE | MEMORY CONFIG._ | PAYMENT METHOD
CHECKS--MONEY ORDERS PREFERRED - COD'S ALSO ACCEPTED

CRAYON

BUY CRAYON AND SAVE $$$ ON PRINTING COSTS !!!

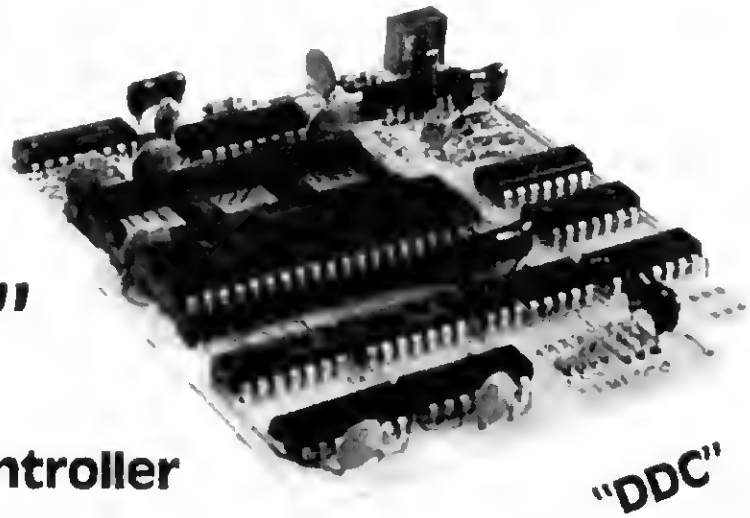
YOU'VE SEEN THE ADS FOR OTHER DRAWING PROGRAMS. SOME CHARGE AS MUCH AS $150.00 FOR THE ABILITY TO ADD GRAPHICS TO YOUR PRINTOUTS. CRAYON ISN'T A CONVERTED TEXT PROCESSOR CRAYON WAS DESIGNED FROM THE GROUND UP TO GIVE YOU THE VERY FINEST GRAPHIC'S EDITOR POSSIBLE. COMPLEX GRAPHICS REQUIRE ROUTINES TO MOVE AND MANIPULATE GRAPHICS THAT NO TEXT PROCESSOR CONTAINS. ALSO CRAYON PRODUCES SUPER HIGH SPEED GRAPHICS. NO OTHER PROGRAM CAN DO AS MUCH FOR AS SMALL AN INVESTMENT. IF YOU ALSO BUY SCRIPTR YOU CAN LOAD CRAYON FILES DIRECTLY INTO SCRIPSIT DURING A PRINT-OUT. BEFORE YOU WASTE YOUR MONEY ON HALF A PROGRAM CHECK OUT CRAYON'S MANY FEATURES. CRAYON DOES IT ALL'''
1). TYPESET LOGO'S - LETTERHEADS - ENVELOPES - BUSINESS CARDS AND OTHER OFFICE FORMS. THIS AD WAS TYPESET FROM AN MX-80 PRINTOUT THEN SHRUNK. COST = 44.50 IF AD WAS TYPESET AT A PRINTSHOP THE COST = $200 +
2). CREATE AND RUN REAL CARTOONS WITH CRAYON AND THEN RUN YOUR CARTOONS FROM BASIC AT ASSEMBLY LANGUAGE SPEEDS. SPEEDS OF 35 FRAMES/SECOND POSSIBLE. USE IT TO DESIGN DISPLAYS FOR USE IN BASIC & ASSEMBLY PROG'S
3). MANAGE DISKETTE DIRECTORIES, PRINT THEM, SEARCH THEM, COMMENT THEM. MOD 3 DIR. WORKS ON A TRSDOS SYS. ONLY.
4). DRAW ANYTHING YOU DESIRE ONTO THE SCREEN AND PRINT IT OUT OR SAVE IT TO DISK/TAPE - UP TO 30 SCREENS/FILE.
5). MANAGE AN APPOINTMENT SCHEDULE, KEEP RECORDS, LISTS OR MENU'S. SAVE/RECALL INFORMATION QUICK AND EASY.
6). PERFORM ALL VIDEO WORKSHEET FUNCTIONS RIGHT ON SCREEN

1). USER FRIENDLY / 42 PAGE DOC'S, OFFSET PRINTED, INDEXED
2). NINE CHARACTER USER DEFINED CURSOR. ----->
3). 16 LETTER COMMANDS FOR GRAPHICS ENTRY.
4). COPY CHARACTERS IN ANY DIRECTION FAST.
5). UPPER/LOWER CASE SUPPORT WITHOUT DRIVERS.
6). DO ALL OF THE FOLLOWING ON VARIABLE LENGTH LINES->
COPY-FILL-DELETE-EXCHANGE-MOVE-PULL-UC/LC-INVERT
GRAPHICS-PRINT-JUSTIFY TEXT-BUFFER/RESTORE TO SCREEN.
7). UTILITIES INCLUDE--> MASK - AUTOMATIC PRINTD NUMBERS CURSOR LOCATION AND VALUE-3 SELECTIVE CLS'S-PATTERN-EXTRA BUFFERS-SCREEN OVERWRITE-HEXDUMP-SEARCHES. MORE
8). FULL DISK / CASS I/O DIR-WRITE-LOAD-APPEND-COPY-KILL SCREENPRINT- OUTPUTS CODES TO DRIVE ANY PARALLEL PRINTER PROFESSIONALLY WRITTEN & SUPPORTED-NO BUGS-2 YRS. IN DESIGN OVER 90 COMMANDS -> FAST / EASY / FUN <- ALL MACHINE LANG. CASS MOD 1+3=435.00 / DISK MOD 1 OR 3=445.00 16K PROGRAM WORKS IN 16K, OR MORE AND ADJUSTS TO MEMORY SIZE CHANGES. ESPECIALLY FOR MX-80, MICROLINE80 AND OTHER BLOCK GRAPHIC PRINTERS. PRINTER NOT REQ. FOR FILE HANDLING + CARTOONS.
CALL / WRITE FOR OUR FREE (8) PAGE BROCHURE

160

See List of Advertisers on page 338

Aerocomp's Proven Best-By Test! The "DDC"



Double Density Controller

★ Technical Superiority

At last! A double density controller for Model I with HIGHER PROB[illegible]ITY OF DATA RECOVERY THAN WITH ANY OTHER DOUBLE DENSITY CONTROLLER ON THE MARKET TODAY! The "DDC" f[illegible]rocomp. No need to worry about the problems that keep cropping up on existing products. AEROCOMP S[illegible] design phase lock loop data separator has a wider capture window than the digital types currentl[illegible] allows high resolution data centering. The finest resolution available with digital circuitry is 1[illegible] "DDC" analog circuit allows infinately variable tuning. Attack and settling times are opt[illegible] The units presently on the market use a write precompe[illegible] Board to board tolerance is extremely wide - in the order of ± 100 ns. T[illegible]s. The bottom line is state of the art reliability!

Satisfied customer writes

A. Brandwein, D.D.S.
New York, New York

I received your (DDC) on 11 07 81 to my astonishment the first attempt to copy my system disk was successful prior to purchasing your double density board I had tried LNW's and Percom's boards without success. My drives are the oldest RS ones that came out. The serial numbers are below 33000. Percom says you should have numbers above 70000 for double density to work.

Yours truly
A. Brandwein

★ Test Proven

Tests were conducted on AEROCOMP'S "DDC", Percom[illegible]d LNW's "LNDoubler"** using a Radio Shack TRS80*** Model I, Level 2, 48 K with T[illegible]om TFD100* disk drive (Siemens Model 82). Diskette was Memorex 3401. T[illegible]sed piece of media to determine performance under adverse conditions. The[illegible]ere installed sequentially in the expansion interface.

The test consisted of formatting 40 tracks on th[illegible]pattern on all tracks. The 6DB6 pattern was chosen because it is recommended as [illegible]turers of drives and diskettes. An attempt was then made to read each sector on the dis[illegible]ng system was Newdos/80, Version 1.0, with Double Zap, Version 2.0. Unreadable sectors were [illegible]. The test was run ten times with each double density controller and the data averaged. Test res[illegible] the table.

★ Features

TRS80 Model I owners who are ready for reliable double density operation will get (1) 80% more storage per diskette, (2) single and double density data separation with far fewer disk I/O errors, (3) single density compatibility and (4) simple plug-in installation. Compatible with all existing double density software.

★ Value

$139.95 for the BEST double density controller on the market.

$179.95 for "DDC" complete with DOSPLUS 3.3D
$229.95 for "DDC" complete with LDOS

★ TEST RESULTS ★

MFR & PRODUCT	SECTORS LOCKED OUT (AVG)
AEROCOMP "DDC"	0
PERCOM "DOUBLER II"	18
PERCOM "DOUBLER A"	250
LNW "LNDOUBLER"	202

Note: test results available upon written request. All tests conducted prior to 8-25-81

Aerocomp's 14 day money back guarantee applies to hardware only. Specials will be prorated. Shipping $2.00 in Cont. US. See opposite page for details.

Data Separators

The advances that make the "DDC" great are incorporated in the new AEROCOMP Single Den[illegible] and Double Density Data Separator ("DDS").

★ Has your original manufacturer left you holding the bag?

If you already own a Percom "Doubler A", "Doubler II" or LNW "LNDoubler", the AEROCOMP "DDS" will make it right. Look at the test results

MFR. & PRODUCT	SECTORS LOCKED OUT	
	WITHOUT "DDS"	WITH "DDS"
PERCOM "DOUBLER II"	18	1
PERCOM "DOUBLER A"	250	0
LNW "LNDOUBLER"	202	0

Note: Same test procedures as "DDC".
* Trademark of Percom Data Co.
** Trademark of LNW
*** Trademark of Tandy Corporation

★ "DDS" $49.95
(Use 1791 chip from your DD Controller)

★ "DDS" with disk controller chip included $79.95

★ Disk controller chip.....$34.95

(Shipping $2.00 Cont. US - see opposite page for details)

Plugs directly into your existing Double Density Controller.

Happy DDS customer writes . . .

I don't often write letters such as this, but I feel I should in this case . . . I am suprised and pleased with your DDS. It is not often a product is better than one expects . . . This (these) test(s) used a Percom Doubler "A". (Test without DDS installed showed many errors). (With DDS) not one error!! After ten (10) tests of formatting and verifing and zeroing NOT ONE FAILURE OR LOCK OUT. Great!

Phil Gnadt
Kansas City, Kansas

See opposite page ▸▸▸▸▸▸

TRS 80*

DISK DRIVES

40 & 80 TRACK

as low as $259.95

NEW LOW PRICES
Thanks to you our sales volume has allowed us to cut costs and we're passing the savings along. We offer the best disk drive value in the market place. Reliability, features and cost tough to beat. We deliver ..and we stand behind our products. AEROCOMP is the only manufacturer to offer FREE TRIAL! Buy Aerocomp drives today. You deserve the best.

BEST FEATURES
- ★ Fast 5 ms. track-track access time.
- ★ Operates single or double density.
- ★ "FLIPPY" feature for lower media cost (40-1 & 80-1)
- ★ Head load solenoid
- ★ Disk ejector.
- ★ Easy entry door
- ★ **NEW** EXTERNAL DRIVE CABLE CONNECTION (no longer need to remove the cover to hook up cable)

EPSON MX80 PRINTERS

$469.00

TRS80 Cable (I & III) $9.95*
APPLE Cable & Interface. $105.00
RS232 Interface. $69.95
Ribbon Cartridge, Black. . . $9.95
Add $6.00 shipping (Cont. U.S.) does not include cable.

MX80 F/T

All the features of MX80 plus Friction Feed. Shipping & cables as above.

$579.00

*With Purchase of Printer

ORDER TODAY!
- ★ 40-Track Drive $299.95
- ★ 80-Track Drive $409.95
- ★ 40-Track "FLIPPY" Drive. . $329.95
- ★ 80-Track "FLIPPY" Drive. . $419.95
- ★ 40-Track Dual-Head Drive $419.95
- ★ 80-Track Dual-Head Drive $569.95

All above drives are complete with silver enclosure, power supply, an external drive cable connection. 115 V AC 50-60 Hz 230 V AC 50-60 Hz available on special order.

- ★ 40-Track Bare Drive $259.95
- ★ 80-Track Bare Drive. . . . $359.95
- ★ 40-Track "FLIPPY" Bare Drive $279.95
- ★ 80-Track "FLIPPY" Bare Drive $369.95

★ SPECIAL PACKAGES ★

STARTER A. $339.95
40-Track Drive, 2-drive cable, TRSDOS 2.3 Disk & Manual, Freight & Ins.

STARTER B $369.95
40-Track "FLIPPY" Drive, cable, TRSDOS 2.3 Disk & Manual, Freight & Ins.

COMBO C. $465.00
40-Track "FLIPPY" Drive, 2-drive cable, **LDOS**, Freight & Ins.

COMBO D $559.00
80-Track "FLIPPY" Drive, 2-drive cable, **LDOS**, Freight & Ins.

COMBO E. $709.00
Two 40-Track "FLIPPY" Drives, 4-Drive cable, TRSDOS 2.3 Disk & Mannual, Freight & Ins.

COMBO F $989.00
Two 80-Track "FLIPPY" Drives, 4-drive **LDOS** Ins.

COMBO G $889.00
Two 40-Track Dual-Head Drives, cable, TRSDOS 2.3 Disk & Manual, Freight & Ins.

COMBO H. $1289.00
Two 80-Track Dual-Head Drives, cable, **LDOS**, Freight & INS

DOSPLUS 3.3 or NEWDOS / 80,2.0 available with any package

Add $5.00 per drive for shipping & handling (Cont. US)

FREE TRIAL OFFER
Order your AEROCOMP Disk Drive and use it with your system for up to 14 days. If you are not satisfied for ANY REASON (except misuse or improper handling), return it, packed in the original shipping container, for a full refund. (Hardware only. Special packages will be prorated) We have complete confidence in our products and we know you will be satisfied! **ORDER TODAY!!!**

WARRANTY
We offer you a 120 day unconditional warranty on parts and labor against any defect in materials and workmanship. In the event service, for any reason, becomes nescessary, our service department is fast, friendly and cooperative.

100% TESTED
AEROCOMP Disk Drives are completely assembled at the factory and ready to plug in when you receive them. Each drive is 100% bench tested prior to shipment. We even enclose a copy of the test checklist, signed by the test technician, with every drive. AEROCOMP MEANS RELIABILITY!!

ORDER NOW!!
To order by mail, specify Model Number(S) of Drive, cable, etc. (above), enclose check, money order, VISA or MASTERCHARGE card number and expiration date, or request C.O.D. shipment. Texas residents add 5% sales tax. Add $5.00 per drive for shipping & handling (Cont. US). Please allow 2 weeks for personal checks to clear our bank. No personal checks will be accepted on C.O.D. shipments-cash, money orders or certified checks only. You will receive a card showing the exact C.O.D. amount before your shipment arrives. Be sure to include your name and shipping address. You will be notified of the scheduled shipping date. Your bank credit card will NOT be charged until the day we ship!!

DRIVE CABLES
2-DRIVE $24.95
4-DRIVE $34.95

WRITE AEROCOMP TODAY FOR MORE VALUES !!!

CALL TOLL FREE FOR FAST SERVICE (800) 824-7888, OPERATOR 24
FOR VISA/MASTERCHARGE/C.O.D. ORDERS
California dial (800) 852-7777 Operator 24. Alaska and Hawaii dial (800) 824-7919, Operator 24
TOLL FREE LINES WILL ACCEPT ORDERS ONLY!
For Applications and Technical information, call (214) 337-4346 or drop us a card

Dealers inqiries invited

AEROCOMP
Redbird Airport, Bldg. 8
P.O. Box 24829
Dallas, TX 75224

✓82

✓See List of Advertisers on page 338

GAME

LOAD 80

The Key Box

Basic Level II
Model I or III
16K RAM

A Kung Fu battle even Bruce Lee might have lost.

Enter the Dragon

Brice Hadlock
5645 Fulton Avenue
Van Nuys, CA 91401

Heve you recently tried to entertain guests with your computer? Then you know a contest taking three days to play is too involved for most people who want to play a game or two on your machine.

The TRS-80 versions of arcade games are a far cry from the real thing and can be disappointing to amusement center devotees.

So what do you show your guests? Kung Fu.

The game is adapted from the television series starring David Carradine. Action takes place on a 10 by 10 grid populated with Shaolin temples, dungeons, outlaws and mystics. You must race against the clock to free Syndi, who has been placed in a dungeon by outlaws.

But before you can free her, you must have two Shaolin masters and five Shaolin priests with you. You can find them in the temples. Also there, you may have one flashback revealing a significant location.

During your travels, you must battle outlaws and mystics who will try to deter you from Syndi.

There's no arcade original of Kung Fu; it won't take longer than the length of your guest's visit to play; but best of all, you won't spend a lot of time and effort entering it or getting it to work.

If you've typed programs from magazines into your computer, you know how discouraging it can be. Program lines are numbered inconsistently. The letter O is used as a variable. Worse than that, the programs contain character strings composed of nothing but spaces without any reference to the number of spaces in the string.

When you get the program running, you find it can't handle invalid entries. The program crashes and to get it ready for guests to play requires hours of modifications. Kung Fu was made to type in. You may use automatic line numbering. There are no spaces to count and no guessing about a character being a zero or O. The program uses INKEY$ for all inputs and won't crash with any invalid input.

However, if you have 16K of RAM, don't embellish the listing with extra spaces; the program runs tight in 16K. If you want to cut down on memory usage you can eliminate the instructions by deleting lines 80-100 and 2270-2380. If you delete the instructions you will save more than 2,000 bytes.

The game's map works like a road map: north is up; east to the right. A location like (5,2) can be located by starting in the upper left corner, counting five letters to the right and two letters down. On the map, D stands for dungeon, T for temple, O for outlaws, M for mystic, E for empty land and ? for what's in the unknown spot.

Model III owners will have to change the program. That model doesn't have printable arrows, so insert a new line 120:

```
120L6$(1) = CHR$(33):L6$(2) = CHR$(63):
L6$(3):CHR$(60):L6$(4) = CHR$(62)
```

With a minimum of problems you should have a good addition to your collection of programs.■

Program Listing

```
10 CLEAR150
20 ' KUNG FU
30 ' BY BRICE HADLOCK
40 CLS:PRINT"INITIALIZING"
50 DIM$(10,10),R(10,10),P(15),T(5),TX(22),M(5),D(2),M1(5),F(5),P
$(15),N$(5),M1$(5),T$(5),D$(2),M2(5),P1(15),PA(5),MA(5)
60 A1$=STRING$(28,CHR$(188)):A2$=STRING$(28,CHR$(191)):A3$=STRIN
G$(28,CHR$(131)):A4$=CHR$(149):A5$=CHR$(148):A6$=CHR$(129):RANDO
M
70 RESTORE:FORA=1TO5:READM$(A):NEXTA:FORA=1TO15:READP$(A):NEXTA:
FORA=1TO5:READT$(A):NEXTA:READ D$(1):READ D$(2):FORA=1TO5:READM1
$(A):NEXTA
80 CLS:PRINT@28,"KUNG FU":PRINT:PRINT"DO YOU WANT INSTRUCTIONS?"
;
90 Y$=INKEY$:IFY$=""THEN90
100 IFY$="Y"THENGOSUB2270
110 CLS:GOSUB2390:Z9=128-(R7*8):CLS:PRINT"INITIALIZING":FORA=1TO
5:PA(A)=3:MA(A)=1:NEXTA
120 L6$(1)=CHR$(91):L6$(2)=CHR$(92):L6$(3)="-"+CHR$(94):L6$(4)=C
HR$(93)+"-"
130 K3$(1)="BANG":K3$(2)="KICK":K3$(3)="FALL":K3$(4)="OUCH":K3$(
5)="TRIP":K3$(6)="THROW":K3$(7)="BREAK"
140 T2$(1)="WHEW!":T2$(2)="WOW!":T2$(3)="SHEW BOY!":T2$(4)="OH M
AN!":T2$(5)="INCREDIBLE":T2$(6)="THAT WAS TOUGH!"
150 FORA=1TO15:P1(A)=0:P(A)=1:NEXTA:FORA=1TO5:M(A)=1:F(A)=1:NEXT
A
160 FORA=1TO10:FORB=1TO10:S(A,B)=1:R(A,B)=0:NEXTB,A
170 FORA=1TO5
180 T=RND(10):T1=RND(10):IFR(T,T1)<>0THEN180
190 T(A)=T+(T1/100)
200 R(T,T1)=A*10:NEXTA
210 FORA=1TO22
220 TE=RND(10):TF=RND(10):IFR(TE,TF)<>0THEN220
230 TX(A)=TE+(TF/100)
240 N=RND(21)+1:N=-N:R(TE,TF)=N:NEXTA
250 FORA=1TO5
260 M4=RND(10):M5=RND(10):IFR(M4,M5)<>0THEN260
270 M1(A)=M4+(M5/100)
280 R(M4,M5)=A*100:NEXTA
290 S2=RND(2)
300 FORA=1TO2
310 DI=RND(10):D2=RND(10):IFR(DI,D2)<>0THEN310
320 D(A)=D1+(D2/100):IFINT(S2)=INT(A)THENS8=D(A)
```

Program continues

Program continued

```
330 R(D1,D2)=A*100:IFA=S2THENR(D1,D2)=R(D1,D2)+3
340 NEXTA
350 CLS
360 Y=INT(T(1)):X=T(1)-Y:X=X*100:X=INT(X+.5)
370 S(Y,X)=R(Y,X)
380 PRINT"YOU ARE AT THE ";T$(1);" TEMPLE";:GOSUB2610:PRINT@576,
"YOU ARE STARTING AT";X;",";Y:T3=X:X=Y:Y=T3:GOSUB490:PRINT"YOU W
ILL START WITH ";J$;" TO AID YOU":PRINT"YOU HAVE";Z0;"DAYS TO SA
VE SYNDI BEFORE THE OUTLAWS KILL HER":GOTO1570
390 GOTO1570
400 CLS:T=3:FORA=1TO10:FORB=1TO10:IFS(A,B)=0PRINTTAB(T);"E";:GOT
O460
410 IFS(A,B)=1THENPRINTTAB(T);"?";:GOTO460
420 IFS(A,B)>9 AND S(A,B)<51THENPRINTTAB(T);"T";:GOTO460
430 IFS(A,B)<501 AND S(A,B)>99THENPRINTTAB(T);"M";:GOTO460
440 IFS(A,B)<0THENPRINTTAB(T);"O";:GOTO460
450 IFS(A,B)>999THENPRINTTAB(T);"D";
460 T=T+6:NEXTB:T=3:PRINT:NEXTA
470 PRINT:PRINT"YOU ARE NOW AT";Y;",";X
480 PRINT:GOTO840
490 Q=R(X,Y)/10
500 D=RND(2):A=2
510 IFD=1THEN530ELSE570
520 IFA=0GOTO680
530 IFPA(Q)>0THENPA(Q)=PA(Q)-1ELSEA=A-1:GOTO560
540 R1=RND(15):IFP(R1)=1THENP1(R1)=1:P(R1)=0ELSE540
550 J$="PRIEST "+P$(R1):RETURN
560 IFA=0GOTO680
570 IFMA(Q)>0THENMA(Q)=0:A=A-1ELSEA=A-1:GOTO520
580 R1=RND(5):IFM(R1)=1THENM2(R1)=1:M(R1)=0ELSE580
590 J$="MASTER "+M$(R1):RETURN
600 J$="SORRY, NO PRIESTS OR MASTERS LEFT TO SPARE IN THIS TEMPL
E":RETURN
610 ' FLASHBACKS
620 Q=R(X,Y)/10:IFF(Q)=0PRINT"THE BEST WE CAN OFFER YOU IS PROTE
CTION, SORRY GRASSHOPPER...":RETURN
630 PRINT"FLASHBACK...":F(Q)=0
640 P3=0
650 P3=P3+1:IFP3=6THEN820ELSEU=RND(6):ONUGOTO660,700,730,760,790
,760
660 FORA=1TO22:J=INT(TX(A)):K=TK(A)-J:K=K*100:K=INT(K+.5):IFS(J,
K)=1THEN680
670 NEXTA:GOTO650
680 PRINT"MASTER ON THE WAY TO THE CASTLE I SAW OUTLAWS AT";K;",
";J;"!"
690 PRINT"GRASSHOPPER, ONLY REMEMBER WHERE tHEY STAY, AND AVOID
THEM...":GOTO830
700 FORA=1TO5:J=INT(T(A)):K=T(A)-J:K=K*100:K=INT(K+.5):IFS(J,K)=
1THEN720
710 NEXTA:GOTO650
720 PRINT"MASTER WHERE IS THE TEMPLE THAT I MUST DELIVER THIS PA
RCHMENT?":PRINT"GRASSHOPPER IT'S";K;"ON THE X AXIS, AND";J;"ON T
HE Y AXIS.":GOTO830
730 FORA=1TO2:J=INT(M1(A)):K=M1(A)-J:K=K*100:K=INT(K+.5):IFS(J,K
)=1THEN750
740 NEXTA:GOTO650
750 PRINT"MASTER, HOW SHALL I AVOID THE NYSTIC ON MY JOURNEY?":P
RINT"GRASSHOPPER, ONE IS HIDING AT";K;",";J;"!":GOTO830
760 FORA=1TO2:J=INT(D(A)):K=D(A)-J:K=K*100:K=INT(K+.5):IFS(J,K)=
1THEN780
770 GOTO740
780 PRINT"MASTER WHERE WILL THE OUTLAWS TAKE THEIR PRISONER?":PR
INT"GRASSHOPPER IT MAY BE THE DUNGEON AT";K;",";J;"WHO CAN SAY?"
:GOTO830
790 J=INT(S8):K=S8-J:K=K*100:K=INT(K+.5):IFR(J,K)<>1006 AND R(J,
K)<>2006THEN800ELSE810
800 PRINT"MASTER WHERE HAVE THE OUTLAWS RIDDEN THE PRINCESS?":PR
INT"GRASSHOPPER, ALL GIRLS ARE TAKEN TO THE DUNGEON AT";K;",";J;
".":S(J,K)=R(J,K)+3:R(J,K)=S(J,K):RETURN
810 GOTO650
820 PRINT"MASTER HOW WILL I COMPLETE THIS TASK?":PRINT"GRASSHOPP
ER, YOU MUST LOOK TO YOUR INNER SELF FOR DIRECTION...":RETURN
830 S(J,K)=R(J,K):RETURN
840 GOSUB2510:PRINT"YOUR MOVE?"
850 W$=INKEY$:IFW$=""THEN850
860 IFN$="N"THEN960
870 IFW$="R"THEN1060
880 IFW$="M"THEN480
890 IFW$="D"THEN1290
900 IFW$="S"THEN970
910 IFW$="E"THEN950
920 IFW$="W"THEN940
930 GOTO840
940 IFY-1<1THEN980ELSEY=Y-1:GOTO990
950 IFY+1>10THEN980ELSEY=Y+1:GOTO990
960 IFX-1<1THEN980ELSEX=X-1:GOTO990
970 IFX+1>10THEN980ELSEX=X+1:GOTO990
980 PRINT"THAT IS ON THE OTHER SIDE OF THE GREAT WALL, TRY AGAIN
.":GOTO840
990 S(X,Y)=R(X,Y):PRINT"YOU ARE NOW AT";Y;",";X:Z9=Z9-1
1000 IFR(X,Y)<51 AND R(X,Y)>9THENS2=R(X,Y)/10:CLS:PRINT"YOU ARE
AT THE ";T$(S2);" TEMPLE":GOSUB2610:GOTO1580
1010 IFR(X,Y)<0CLS:PRINT"OH NO, YOU HAVE RAN INTO A BAND OF";ABS
(R(X,Y));"OUTLAWS":GOTO1610
1020 IFR(X,Y)>999THEN2030
1030 IFR(X,Y)=100 OR R(X,Y)=200 OR R(X,Y)=300 OR R(X,Y)=400 OR R
(X,Y)=500THEN2140
1040 PRINT"YOU ARE ON AN EMPTY PIECE OF LAND"
1050 GOTO840
1060 CLS:PRINT"REPORT...":PRINT
1070 J=INT(D(1)):K=D(1)-J:K=K*100:K=INT(K+.5):IFR(J,K)=1006THENP
RINT"YOO KNOW THAT SYNDI IS IN THE DUNGEON AT";K;",";J:PRINT
1080 J=INT(D(2)):K=D(2)-J:K=K*100:K=INT(K+.5):IFR(J,K)=2006THENP
RINT"YOU KNOW THAT SYNDI IS IN THE DUNGEON AT";K;",";J:PRINT
1090 G6=0:FORA=1TO15:IFP1(A)=1THENG6=G6+1
1100 NEXTA:IFG6=0PRINT"YOU DON'T HAVE ANY PRIESTS":GOTO1150
1110 IFG6=1PRINT"YOU HAVE ONE PRIEST, HE IS PRIEST ";:GOTO1270
1120 PRINT"YOU HAVE";G6;"PRIESTS, THEY ARE..."
1130 PRINT"* ";:FORA=1TO15:IFP1(A)=1:PRINTP$(A);" * ";
1140 NEXTA:PRINT
1150 PRINT:G6=0:FORA=1TO5:IFM2(A)=1THENG6=G6+1
1160 NEXTA:IFG6=0:PRINT"YOU DON'T HAVE ANY MASTERS":GOTO1240
1170 IFG6>1THEN1210
1180 IFG6=1PRINT"YOU HAVE ONE MASTER, HE IS MASTER ";:FORA=1TO5:
IFM2(A)=1PRINTM$(A)
1190 NEXTA
1200 GOTO1240
```

Program continues

YORK 10
BASF-DPS
WORLD STANDARD TAPE

MONEY BACK GUARANTEE

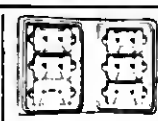
PREMIUM 5-SCREW SHELL FITS ALL STANDARD RECORDERS

COMPUTER GRADE BLANK CASSETTES

DATA TRAC / C-05, C-10, C-20

PHILIPS (NORELCO) TYPE HARD BOXES

SOFT PROPYLENE HINGED BOXES


6 CAPACITY CASSETTE ALBUMS

TRACTOR FEED BLANK DIE-CUT LABELS

HERE'S WHAT USERS SAY ABOUT YORK 10 CASSETTES:

"We monitored the output to the computer with a specially built meter and found absolutely no dropouts throughout the tape . . ."
Stace Papadopoulos
Beaverton, OR

"High quality tape in the proper lengths and at the right price. Keep it up."
William E. Brown, Jr
Reisterstown, MD

"It's nice to have a tape you can rely on 100% of the time to perform with such quality. And the fast, courteous service was a pleasant surprise."
Tom Parkinson
Madison, OH

"Your price is right – your service and quality is excellent. We'll be doing business again!"
Richard P. Thrun
APO New York

YOU'VE TRIED THE REST, NOW BUY THE BEST

VISA Call: 213/710-1430 for IMMEDIATE SHIPMENT on Credit Card Orders.

ORDER NOW . . . YORK 10 Computerware

MAIL TO: 24573 Kittridge St., #80J, Canoga Park, CA 91307

✓156

ORDER FORM

ITEM	1 DOZEN	2 DOZEN	TOTAL
C-05	☐ 7 50	☐ 13 50	
C-10	☐ 8 00	☐ 14 40	
C-20	☐ 10 00	☐ 18 00	
Hard Box	☐ 2 50	☐ 4 00	
Soft Box	☐ 2 00	☐ 3 40	
6 Cap Album @ $6 95 each quantity			
Blank labels	☐ 4 00/100	☐ 30 00/1000	
		SUB TOTAL	
Calif. residents add 6% sales tax			
Shipping 1 doz $2, 2 doz $3 50, 3 doz $4 50 each additional doz $ 50			
For Parcel Post instead of UPS ADD $1			
Outside Continental USA, ADD $2			
		TOTAL	

Each cassette includes two YORK 10 labels only. Boxes are sold separately. Shipments are by UPS unless Parcel Post requested.

Boxes, albums, & blank labels are free of shipping charges when ordered with cassettes. When ordered separately Minimum shipping is $2.00

PLEASE SEND QUANTITY DISCOUNTS ☐

Check or M.O. enclosed ☐ Charge to Credit Card: ☐ VISA ☐ MASTERCHARGE

Card No. Exp.

Name

Address

City State/Zip

Signature

Computer make & model

✓See List of Advertisers on page 338

IN CHICAGO

. . . YOU'VE HEARD ABOUT US . . .

EbG & ASSOC

Emmanuel B. Garcia, Jr. & Associates
203 North Wabash Ave. • Chicago, IL 60601
312/782-9750

- serving the TRS-80* community since 1978
- publisher of "Chicatrug News" (write for sample issue)
- well-stocked display room
- quality products only
- personalized service
- good technical support
- repair facilities

. . . NOW HEAR THIS . . .

ANNOUNCING THE OPENING OF
OUR NEW MORRIS, ILLINOIS STORE:

EbG & Associates
RADIO SHACK* DEALER STORE #R-619
531 Bedford Road • Morris, IL 60450
815/942-9521
Toll Free No: (800) 621-2141
FOR ORDERS ONLY

PREPAID ORDERS SHIPPED PROMPTLY.
AMERICAN EXPRESS / VISA / MASTERCHARGE & C.O.D. ACCEPTED. (Add $2 shipping; $9 per drive or printer.)

*Trademark of Tandy Corporation

271

Color Computer News

Subscribe to CCN

Are you tired of searching the latest magazine for articles about your new Color Computer? When was the last time you saw a great sounding program listing only to discover that it's for the Model I and it's too complex to translate? Do you feel that you are all alone in a sea of Z-80's? On finding an ad for a Color Computer program did you mail your hard earned cash only to receive a turkey because the magazine the ad appeared in doesn't review Color Computer Software? If you have any of these symptoms you're suffering from Color Computer Blues!

But take heart there is a cure!

It's COLOR COMPUTER NEWS.

The monthly magazine for Color Computer owners and only Color Computer owners. CCN contains the full range of essential elements for relief of CC Blues. Ingredients include: comments to the ROMS, games, program listings, product reviews, and general interest articles on such goodies as games, personal finances, a Kid's page and other subjects.
The price for 12 monthly treatments is only $21.00 and is available from:

Mail Today!

REMarkable Software
P.O. Box 1192
Muskegon, MI 49443

145

NAME _____

ADDRESS _____

CITY _____ State _____ Zip _____

Allow 8-10 weeks for 1st issue. 80 M

Program continued

```
1210 PRINT"YOU HAVE";G6;"MASTERS, THEY ARE..."
1220 PRINT"  ";:FORA=1TO5:IFN2(A)=1PRINTM$(A);" • ";
1230 NEXTA:PRINT
1240 PRINT:PRINT"YOU HAVE";Z9;"DAYS LEFT BEFORE THEY KILL SYNDI"

1250 PRINT"LEGAL MOVES: 'N' NORTH, 'S' SOUTH, 'E' EAST, 'W' WEST
, 'M' MAP":PRINT"'R' REPORT, 'D' DISCOVER."
1260 GOTO840
1270 FORA=1TO15:IFPI(A)=1PRINTP$(A):GOTO1150
1280 NEXTA
1290 Z9=Z9-1:PRINT"WHICH DIRECTION DO YOU WISH TO EXPLORE AND NO
T ENTER?"
1300 W1$=INKEY$:IFW1$=""THEN1300
1310 IFW1$="N"THEN1360
1320 IFW1$="S"THEN1370
1330 IFW1$="E"THEN1380
1340 IFW1$="W"THEN1390
1350 PRINT"COME AGAIN...":GOTO1290
1360 IFX-1<1THEN1400ELSEQ3=X-1:GOTO1410
1370 IFX+1>10THEN1400ELSEQ3=X+1:GOTO1410
1380 IFY+1>10THEN1400ELSEQ4=Y+1:GOTO1420
1390 IFT-1<1THEN1400ELSEQ4=Y-1:GOTO1420
1400 PRINT"THAT'S ON THE OTHER SIDE OF THE GREAT WALL. WHY LOOK
THERE?":GOTO840
1410 Q4=Y:GOTO1430
1420 Q3=X:GOTO1430
1430 PRINT"AT";Q4;",";Q3;"LIES ";
1440 S(Q3,Q4)=R(Q3,Q4):IFR(Q3,Q4)<8PRINT"A BAND OF OUTLAWS":GOTO
1490
1450 IFR(Q3,Q4)=8PRINT"A PIECE OF LAND THAT IS EMPTY":GOTO1490
1460 IFR(Q3,Q4)>9 AND R(Q3,Q4)<51THENPRINT"A TEMPLE":GOTO1490
1470 IFR(Q3,Q4)>99 AND R(Q3,Q4)<58ITHENPRINT"A MYSTIC":GOTO1490
1480 IFR(Q3,Q4)>999THENPRINT"A DUNGEON"
1490 GOTO840
1500 PRINT@575,CHR$(32);:PRINT:J$="":PRINT"A=GET A PRIEST OR A M
ASTER  F=GET A FLASHBACK"
1510 W1$=INKEY$:IFW1$="A"THENS3=1:GOTO1540
1520 IFW1$="F"THENS3=2:GOTO1540
1530 GOTO1510
1540 ONS3GOSUB490,610
1550 IFLEN(J$)>5@THENPRINTJ$:GOTO1570
1560 IFS3=1 AND J$<>""THENPRINT"YOU NOW HAVE ";J$;" TO ASSIST YO
U"
1570 PRINT"DO YOU WANT TO WAIT AT THE TEMPLE FOR A DAY?"
1580 Q5$=INKEY$:IFQ5$=""THEN1580
1590 IFQ5$="Y"THENZ9=Z9-1:A=576:FORAI=1TO6:PRINT@A,CHR$(38);:A=A
+64:NEXTAI:PRINT@575,CHR$(32);:GOTO1500
1600 GOTO840
1610 GOSUB2570:U$=" ":PRINT@703,U$;:V=ABS(R(X,Y))
1620 GOSUB1630:GOTO1780
1630 W=0
1640 FORA=1TO15:IFP1(A)=1THENW=W+1
1650 NEXTA
1660 W1=0
1670 FORA=1TO5:IFN2(A)=1THENW1=W1+1
1680 NEXTA
1690 RETURN
1700 IFW1+W<3 AND V>9THENPRINT@784,"YOU HAVE BEEN KILLED BY THE
OUTLAWS":GOTO2240
1710 GOTO1740
1720 T6=RND(12):IFT6=4PRINT@784,"ALL YOUR ASSISTANTS HAVE BEEN K
ILLED BY THE OUTLAWS, YOU BARELY ESCAPE":FORA=1TO15:P1(A)=0:NEXT
A:FORA=1TO5:N2(A)=0:NEXTA:GOTO840
1730 GOTO1760
1740 IFW1+W=0PRINT@784,"YOU HAVE BEEN GIVEN A TORTUROUS DEATH BY
 THE OUTLAWS...":GOTO2240
1750 GOTO1720
1760 W5=W+W1:IFV/3.5>W5THEN1790
1770 IFV/2>W5THEN1950
1780 A=RND(2)+1:Z9=Z9-A:PRINT@784,"ALL OF THE OUTLAWS HAVE BEEN
KILLED, GOOD WORK":PRINT"YOU LOSE";A;"DAYS IN DEFEATING THEM THO
UGH...":S(X,Y)=0:R(X,Y)=0:GOTO840
1790 IFW5<3THEN E=RND(W5)ELSE E=RND(3)
1800 IFE<1THEN840
1810 GOSUB1020:GOTO840
1820 L0=W:TG=0:FORA=1TOE
1830 Y7=RND(15):IFP1(Y7)=1THENP1(Y7)=0:PRINT"PRIEST ";P$(Y7);" D
IES FIGHTING THE OUTLAWS":GOTO1850
1840 IFW=0THEN1870ELSE1830
1850 TG=TG+1:L9=L9-1:IFL9=0THEN1870
1860 NEXTA:IFTG=1RETURN
1870 IFW1=0THENRETURN
1880 IFTG=1RETURN
1890 E=E-TG:IFE>W1THENE=W1
1900 IFW1<=0 OR E<=0THEN840
1910 FORA=1TOE
1920 Y7=RND(5):IFN2(Y7)=1THENN2(Y7)=0:PRINT"MASTER ";M$(Y7);" DI
ES IN BATTLE AGAINST THE OUTLAWS":GOTO1940
1930 GOTO1920
1940 NEXTA:RETURN
1950 S(X,Y)=0:R(X,Y)=0
1960 PRINT"ALL THE OUTLAWS HAVE BEEN KILLED, BUT...":S(X,Y)=0:R(
X,Y)=0
1970 IFW=0THEN2000
1980 Y7=RND(15):IFP1(Y7)=1PRINT"PRIEST ";P$(Y7);" HAS BEEN INJUR
ED":GOTO2020
1990 GOTO1980
2000 Y7=RND(5):IFN2(Y7)=1PRINT"MASTER ";M$(Y7);" HAS BEEN INJURE
D":GOTO2020
2010 GOTO2000
2020 C4=RND(3)+1:Z9=Z9-C4:PRINT"YOU LOSE";C4;"DAYS":GOTO840
2030 CLS:S3=R(X,Y)/1000:S3=INT(S3):PRINT"YOU ARE AT THE ";D$(S3)
;" DUNGEON":GOSUB2500:W2$=" ":PRINT@639,W2$;
2040 GOSUB1630:IFW<5 OR W1<2PRINT"YOU DON'T HAVE ENOUGH PRIEST'S
 & MASTER'S TO OPEN THE DUNGEON":PRINT"THOUGH.":GOTO840
2050 PRINT"DO YOU WANT TO OPEN THE DUNGEON?"
2060 W3$=INKEY$:IFW3$="Y"THEN2080
2070 IFW3$="N"THEN2110ELSE2060
2080 IFR(X,Y)=1000 OR R(X,Y)=2000THEN2100
2090 GOSUB2690:IFZ9<=1THEN2120ELSEPRINT"YOU HAVE FOUND SYNDI, AN
D HELPED HER TO GET FREE IN TIME!!!":PRINT:PRINT"YOU WIN WITH";Z
9;"DAYS LEFT":GOTO2240
2100 Y7=RND(3)+1:Z9=Z9-4:PRINT"WRONG DUNGEON, SYNDI IS NOT HERE,
 YOU LOSE";Y7;"DAYS LOOKING.":PRINT
2110 GOTO840
2120 IFZ9=0THEN2130ELSEPRINT"WOW, JUST IN TIME, YOU GOT SYNDI OU
```

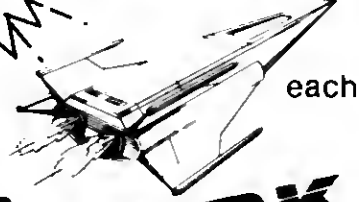
Program continues

COLOR COMPUTER
ACTION GAMES
FAST=EFFICIENT=MACHINE LANGUAGE

ARCADE GAMES

NEW!

ASTRO BLAST



A new super hi-res space game.
Wave after wave of alien attackers. . .
each one a different and unique challenge to your skills.
CASSETTE (16K) . . . $24.95
DISC (32K) . . . $29.95

COLOR BERSERK

They're calling this one a "classic". You'll have hours of fast-paced fun zapping robots. Super hi-res action!
CASSETTE (16K) . . . $24.95
DISC (32K) . . . $29.95

CAVE HUNTER

Outsmart the creatures that pursue you as you hunt for treasure in a maze of cave passages. Lots of colors and sounds!
CASSETTE (16K) . . . $24.95
DISC (32K) . . . $29.95

"Finally . . . software worthy of the Color Computer." K.C. Westerly, RI
"The ads and reviews were right. Great stuff!" R.S. Los Angeles, CA

ADVENTURE GAMES

Calixto Island

A challenging puzzle with an occasional twist of humor. There's a treasure waiting to be discovered!
CASSETTE (16K) . . . $19.95

The Black Sanctum

For the player who enjoys suspense. . .
You'll encounter the forces of black magic in this spooky adventure.
CASSETTE (16K) . . . $19.95

SEND FOR OUR LATEST FLYER.
GET ON OUR MAILING LIST.

VISA master charge

BUY DIRECT

We pay shipping on all orders in the continental U.S. and Canada. Overseas add $3.00. California residents please add 6% sales tax.

We are always looking for quality machine language programs. Contact us for details.

MARK DATA PRODUCTS
23802 BARQUILLA, MISSION VIEJO, CA 92691 • (714) 768-1551

241

See List of Advertisers on page 338

MASTER ELECTRONICS, INC.

*TRS-80 Is a tredemark of Tandy

CAN SET YOU UP IN A

TRS-80

STATE-OF-THE-ART-COMPUTER

STARTING AT 15% DISCOUNT!

FULLY STOCKED
IN: Model II's
Model III's
ALL- PRINTERS
AND — MORE!!
* PLUS *
THE ALL NEW:

Model 16 and the 8.5 meg. Hard Drive!

CALL US NOW!!!

Toll FREE: 1-800-531-7323

TEXAS CALL COLLECT 512/689-5536

MASTER ELECTRONICS, INC.
154 NORTH 5th
RAYMONOVILLE, TX 78580

MasterCard VISA

146

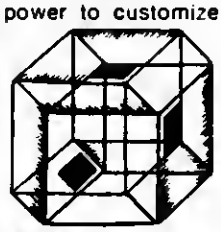
INTERACTIVE CONTROL LANGUAGE

Imagine someone smart standing by, as you work with computer, ready to assist you with advice as well as to take over part of your work! This is what ICL does — perfect "middleman" which stands between user, DOS and application programs.

.....ICL at a glance.....

ICL monitor	— DOS-like command level for execution of Dos commands, /CMD files and /ICL procedures. Fast, efficient and convenient in use.
Basic functions	— automation of work with computer, software enhancement/customization, interfacing of different programs.
Basic features	— intelligent operation, virtual keyboard and display I/O, control interception.
Language	— commands, variables, conditionals, literals.
Package	— 32K and 48K versions, lots of examples, 6 ready to use procedures, 57 page manual. Same version works with both models and all operating systems.
DOS required	— TRSDOS* — NEWDOS/21 * — NEWDOS/80 *
Min hardware	— 32K 1 drive TRS80 Modal I or Model III *
Price	— $34.95

The INTERACTIVE CONTROL LANGUAGE is a brand-new software. It gives you unprecedented power to customize and improve your software and make it wotk the way you want it to work!



ICL is so universal, multifunctional and flexible, it becomes a necessity for every microcomputer user no matter what is the application — business, science, education or just hobby!

Immediate delivery
Order now — only 34.95, manual alone — $10
Add $1.50 s/h (check or money order)

XYZT COMPUTER DIMENSIONS Inc.
2 PENN PLAZA, Suite 1500
New York, N. Y. 10121
(212) 244-3100

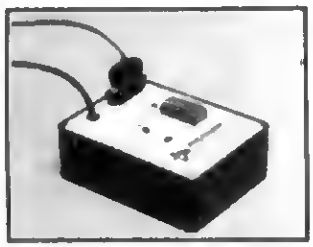
Write for more information

158 * — registered trademarks.

Program continued

```
T 1 DAY BEFORE SHE WOULD":PRINT"HAVE BEEN KILLED, GOOD WORK!!!":
GOTO2240
2130 PRINT"OH WOW, YOU GRABBED HER OUT OF ONE OF THE OUTLAWS ARM
S,":PRINT"ANOTHER MOMENT AND SHE WOULD HAVE BEEN KILLED!!!":GOTO
2240
2140 S3=R(X,Y)/100:S3=INT(S3+.5)
2150 CLS
2160 PRINT"YOU HAVE INVADED THE LAND OF THE GREAT NTSTIC ";N1$(S
3)
2170 FORA=1TO200:NEXTA
2180 FORA=1TO100:B=RND(4):C=RND(638)+64:PRINT@C,L6$(B);:NEXTA
2190 GOSUB163:IFW<3 OR W1<1THENPRINT@704,"THE NTSTIC ";N1$(S3);
" HAS MADE YOU KILL YOURSELF!!!":GOTO2240
2200 Y7=12:IFI9<12THENY7=I9-1
2210 Y7=RND(Y7)+1
2220 PRINT@704,"YOU HAVE DESTROYED ";N1$(S3);" THE NTRTIC, BUT I
T TOOK";Y7:PRINT"DAYS TO DO IT!!!":S(X,Y)=0:R(X,Y)=0:I9=I9-Y7:PR
INT:GOTO48
2230 GOTO840
2240 PRINT:PRINT"WANT TO PLAY AGAIN (Y/N)"
2250 Q$=INKEY$:IFQ$=""THEN2250
2260 IFQ$="Y"THEN10ELSEPRINT:PRINT"WE SHALL MEET AGAIN, (BUMBLE
BOMS)...":END
2270 CLS:PRINT"THE GAME TAKES PLACE IN CHINA. THE AREA IS REPRES
ENTED BY A 10":PRINT"BY 10 GRID. ON THE GRID ARE SHAOLIN TEMPLES
, DUNGEONS, OUTLAWS,":PRINT"NYSTICS, AND EMPTY SPACES.":PRINT
2280 PRINT"THE OBJECT OF THE GAME IS TO FREE SYNDI FROM A DUNGEO
N THAT":PRINT"THE NEFARIOUS OUTLAWS HAVE PUT HER IN. TO OPEN THE
 DUNGEON":PRINT"YOU MUST HAVE TWO SHAOLIN MASTERS AND FIVE SHAOL
IN PRIESTS."
2290 PRINT:PRINT"THERE ARE FIVE SHAOLIN TEMPLES, TWO DUNGEONS, F
IVE NTSTICS,":PRINT"AND A LOT OF OUTLAWS.":PRINT
2300 PRINT"EACH TEMPLE WILL GIVE YOU UP TO THREE PRIESTS AND ONE
 MASTER,":PRINT"BUT ONLY ONE AT A TIME. YOU MAY ALSO GET ONE PLA
CEBACK FROM":PRINT"EACH TEMPLE WHICH WILL TELL YOU AN IMPORTANT
LOCATION.":GOSUB2430
2310 CLS:PRINT"THE OUTLAWS ARE MEAN, AND CAN KILL ALL OR SOME OF
 YOUR PRIESTS":PRINT"AND MASTERS IF YOU ENCOUNTER THEM. THE NTST
ICS ARE A BIT LESS":PRINT"DEADLY, HOWEVER, THEY USUALLY TAKE MAN
Y DAYS TO OVERCOME.":PRINT
2320 PRINT"YOU CAN MOVE NORTH, SOUTH, EAST, AND WEST. IN ADDITIO
N YOU CAN":PRINT"LET YOUR PRIESTS OR MASTERS SPY ON A NEIGHBORIN
G AREA WITHOUT":PRINT"ENTERING IT. MOVING, AND 'DISCOVERING' TAK
E ONE DAY EACH.":PRINT
2330 PRINT"YOU MAY ALSO ASK FOR A MAP WHICH WILL SHOW YOU ALL TH
AT YOU":PRINT"CURRENTLY KNOW ABOUT THE LOCATION OF THINGS. IN AD
DITION TO":PRINT"THIS YOU MAY ASK FOR A REPORT THAT WILL TELL YO
U LEGAL MOVES,"
2340 PRINT"HOW MANY PRIESTS AND MASTERS YOU HAVE, AND DAYS LEFT.
":GOSUB2430
2350 PRINT"THE LEGAL MOVES ARE 'N' NORTH, 'S' SOUTH, 'E' EAST, '
W' WEST,":PRINT"'R' REPORT, 'D' DISCOVER, AND 'M' MAP.":PRINT
2360 PRINT"THE SKILL LEVEL YOU CHOOSE DETERMINES THE NUMBER OF D
AYS YOU":PRINT"HAVE TO SAVE SYNDI BEFORE THE OUTLAWS KILL HER. T
HE HIGHER THE":PRINT"NUMBER YOU PICK AS YOUR SKILL LEVEL THE LES
S DAYS YOU WILL HAVE":PRINT"TO SAVE SYNDI.":PRINT
2370 PRINT"YOU START AT THE NANCHANG SHAOLIN TEMPLE WITH A PRIES
T OR":PRINT"MASTER TO HELP YOU. WHEN AT A TEMPLE YOU HAVE THE OP
TION OF":PRINT"STAYING FOR A DAY; IN DOING THIS YOU MAY POSSIBLY
 GET MORE"
2380 PRINT"THAN ONE ASSISTANT WHILE YOU'RE AT THE TEMPLE.":PRINT
:PRINT"GOOD LUCK!!!  PRESS ANY KEY TO BEGIN YOUR HONORABLE MISSI
ON";:GOSUB2440:RETURN
2390 PRINT"SKILL LEVEL 1-8"
2400 Y2$=INKEY$:IFY2$=""THEN2400
2410 R7=VAL(Y2$):IFR7<1 OR R7>8PRINT:PRINT"1-8 PLEASE":PRINT:GOT
O2390
2420 RETURN
2430 PRINT:PRINT"PRESS ANY KEY TO CONTINUE";
2440 C9$=INKEY$:IFC9$<>""THENCLS:RETURN
2450 GOTO2440
2460 DATAKABN,POE,CHOU,CONFUCIUS,HAN
2470 DATALUN YI,CHUN-TZU,TAO,TUAN-MU,YU JO,PU SHANG,TSENG TE'AN,
HO-CHI,YEN HUI,CHUAN-SUN SHIH,CHI-SUN FEI,LIN FANG,WANG-SUN CHIA
,SHAI CHANG CAIRE,TA-HSIANG
2480 DATANANCHANG,TEHCHON,CANTON,HANTON,CHAOTUNG
2490 DATALUCHON,CHAMDO,SUCHON,TUREN
2500 DATAJAN YUNG,KUAN CHUNG,CHOU JEN
2510 IFI9<=0PRINT"SORRY, TIME RAN OUT, SYNDI HAS ALREADY BEEN KI
LLED...":PRINT:GOTO2240
2520 GOSUB163
2530 R3=0:FORA=1TO5:R3=R3+PA(A)
2540 NEXTA:R4=0:FORA=1TO5:IFMA(A)=1THENR4=R4+1
2550 NEXTA:IFR3+W<5 OR R4+W1<2PRINT:PRINT"NOT ENOUGH HELP IS LEF
T TO OPEN THE DUNGEON, SHE WILL DIE...":GOTO2240
2560 RETURN
2570 FORT=1TO200:NEXTT:Q$=STRING$(6,32):FORA=1TO12:B=RND(638)+64
:C=RND(7):PRINT@B,K3$(C);:FORT=1TO100:NEXTT:PRINT@B,Q$:NEXTA:A=R
ND(6):B=LEN(T2$(A)):B=(63-B)/2:B=INT(B):PRINT@B+320,T2$(A);:RETU
RN
2580 FORA=53TO73:SET(A,5):SET(A,20):NEXTA:FORA=5TO26:SET(52,A):S
ET(74,A):SET(53,A):SET(73,A):NEXTA
2590 FORA=57TO69:SET(A,10):SET(A,16):NEXTA:FORA=10TO16:SET(57,A)
:SET(69,A):SET(60,A):SET(63,A):SET(66,A):NEXTA
2600 RETURN
2610 ' DRAW TEMPLE
2620 PRINT@330,A1$;A5$;:PRINT@482,A2$;A4$;:PRINT@466,A2$;A4$;:PR
INT@530,A3$;A6$;
2630 B=54:C=70:C1=15:FORA=1TO5:FORB1=BTOC:SET(B1,C1):NEXTB1:C1=C
1-1:B=B+2:C=C-2:NEXTA
2640 SET(36,15):SET(92,15):SET(64,10)
2650 FORA=1TO3:FORB=1TO3:SET(A+34,B+11):SET(98+A,B+11):SET(62+A,
6+B):NEXTB,A
2660 FORA=1TO5STEP4:SET(A+33,13):SET(A+89,13):SET(A+61,6):NEXTA
2670 FORA=0TO1:SET(36,A+10):SET(92,A+10):SET(64,A+5):NEXTA
2680 RETURN
2690 A=64:FORB=1TO9:PRINT@A,CHR$(30);:A=A+64:NEXTB
2700 FORA=1TO3:SET(A+62,6):SET(A+62,7):NEXTA:SET(64,8):SET(65,8)
:FORA=1TO4:FORB=1TO3:SET(A+61,B+8):NEXTB,A:A=9:FORB=1TO5:SET(B+6
5,A):A=A+1:NEXTB:SET(62,10):SET(61,11):SET(60,16):SET(59,9)
2710 FORA=1TO9:FORB=1TO3:SET(B+62,A+11):NEXTB,A:FORA=1TO7:SET(62
,A+13):SET(66,A+13):NEXTA:FORA=1TO6:SET(61,A+14):SET(67,A+14):NE
XTA:FORA=1TO4:SET(60,A+16):SET(68,A+16):NEXTA:FORA=1TO2:SET(59,A
+18):SET(69,A+18):NEXTA
2720 PRINT@516,"***  YOU HAVE SAVED ME, I AM FOREVER IN YOUR DEB
T  ***":PRINT@639,CHR$(32):RETURN
2730 END
```

Model 953A EPROM PROGRAMMER



- Programs 2508, 2758, 2516, 2716, 2532 and 2732 five volt EPROMS.
- Complete - no personality modules to buy.
- Intelligent - microprocessor based programs and verifies any or all bytes.
- RS-232 serial interface - use with computer or terminal.
- Verify erasure command - verifies that EPROM is erased.
- Extended diagnostics - error output distinguishes between a bad EPROM and one which needs erasing.
- May be used for extremely reliable data or program storage.
- All power on programming socket under processor control. LED warning light indicates when power is applied.
- Complete with Textool zero insertion force socket.
- High performance/cost ratio.
- Standard DB 25 I/O connector.

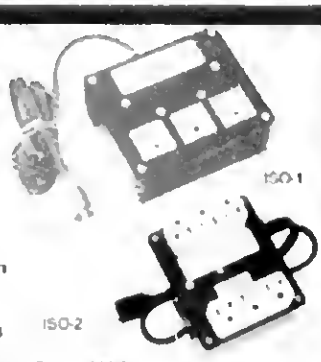
PRICE $289

BAY TECHNICAL ASSOCIATES, Inc.
HWY 603 P.O. BOX 387
BAY ST. LOUIS, MISSISSIPPI 39520
(601) 467-8231

↵243

WARNING!

Electric Power Pollution.
Spikes & Lightning
HAZARDOUS to
MICROCOMPUTERS!!



Patented ISOLATORS provide protection from ...

- Computer errors cause by power line interference
- Computer errors due to system equipment interaction
- Spike damage caused by copier/elevator/air conditioners
- Lightning caused damage

MONEY BACK GUARANTEE!

- ISOLATOR (ISO-1) 3 Isolated 3-prong sockets. Spike Suppression; useful for small offices, laboratories, classrooms. $89.85
- ISOLATOR (ISO-2) 2 isolated 3-prong socket banks; (6 sockets total); Spike Suppression, useful for multiple equipment installations. $69.95
- SUPER ISOLATOR (ISO-3) similar to ISO-1 except double isolation & oversize Spike Suppression; widely used for severe electrical noise situations such as factories or large offices $104.95
- SUPER ISOLATOR (ISO 11) similar to ISO-2 except double isolated socket banks & Oversize Spike Suppression, for the larger system in severe situations $104.95
- MAGNUM ISOLATOR (ISO-17) 4 Quad Isolated Sockets, Multiple Spike Suppressors. For ULTRA-SENSITIVE Systems in extremely Harsh environments. $181.95
- CIRCUIT BREAKER, any model (Add CB) Add $9.00
- REMOTE SWITCH any model (Add RS) Add $16.00

AT YOUR DEALERS MasterCard, Visa, American Express
ORDER TOLL FREE 1-800-225-4876 (except AK, HI, PR & Canada)

Electronic Specialists, Inc. ↵159
171 South Main Street, Box 389, Natick, Mass. 01760
(617) 655-1532

FREE EPSON MX-80 PRINTER

With the purchase of a TRS 80, Model III.

For a limited time, Data Services, Inc., will give you a FREE Epson MX-80 Printer ($645 value) when you buy a TRS 80 Model III, 48k, with 2 PERCOM 40 track drives, at our new low prices of $2,395.00.

(Includes RS-232 Printer Cable TRSDOS.)*

The perfect system, the perfect price! TRS 80 Model III, 48k - two PERCOM 40 track drives - EPSON MX-80 Printer.

Data Services offers more — APPARAT'S NEWDOS 80 version VER 2.0, regularly $149.95 — now only $129.95 (Model III units only.)

Up to 20% savings on TRS computers — accessories — programs. Plus EPSON / PERCOM / APPARAT / HAYES SMARTMODEM / VERBATIM DISKETTES / MEMOREX DISKS.

*TRS 80 is a trademark of Tandy Corporation

- FREE SHIPPING in 48 contiguous states
- No Sales Tax on out-of-state orders
- Visa/Master Card welcome
- Personal checks allow 3 weeks to clear.
- (International orders, freight F.O.B. Wichita, Kansas)

CALL TOLL FREE: 1-800-835-1129
or order by mail from:

DATA SERVICES, INC.
COMPUTER SERVICES SINCE 1970 ↵118

P.O. Box 1157 Wichita, Kansas 67201-1157
(In Kansas, call 1-316-838-9021)

↵See List of Advertisers on page 338

Buck Starton and you take on the Klaxons.

Conquest of Memory Alpha

L.L. Myers
5000 Herbour Lake Drive Apt. A-2
Goose Creek, SC 29445

The time period is the 24th century. Earth has colonized hundreds of planets throughout the galaxy. In 2320 A.D. an evil race, the Klaxons, attacked the colonies in an attempt to obliterate homo sapiens forever.

And so began the galactic conflict of 2330 A.D. After 10 years of war the Klaxons, without warships to continue the struggle, retreated to remote corners of the universe.

Many years passed until, finally, the Earth was able to boast of peaceful commerce between the stars. During the war, however, many people were killed and families separated. Their survivors asked the Galactic Council to search for missing loved ones, but were told it was not cost-effective.

The Key Box

Basic Level II
Models I or III
16K RAM

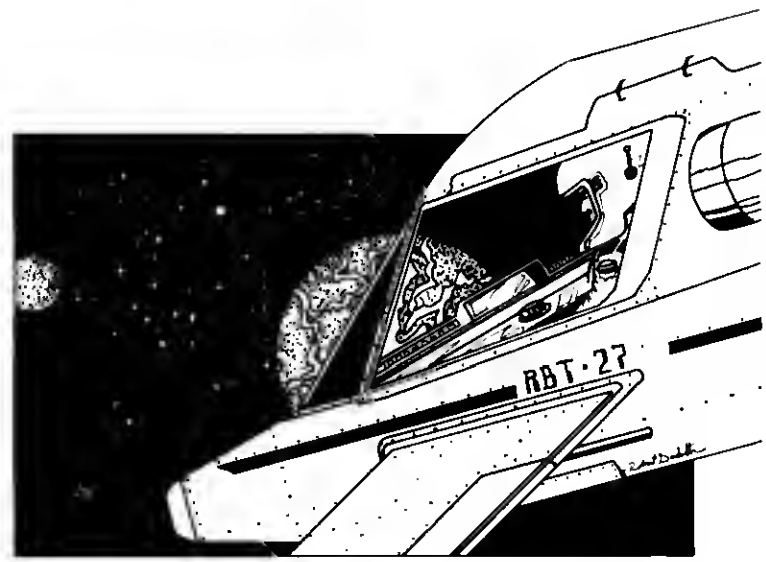
The Game Scenario

Buck Starton shook his head groggily as he awoke in his cell. He felt a peculiar bump at the back of his neck near the base of his skull. With his fingers he felt the outline of a beetle-shaped device under his skin.

Starton, from a backwards planet in the Grenly sector, was educated enough to know a surgical implant when he felt one. He quivered as he considered the implant's implications. Here he was, a Klaxon prisoner, held on some unknown remote planet, in an unpopulated section of the galaxy, with an implant in his neck.

Starton remembered hearing about Klaxon prisoners during the war; human robots they were called. They still had their minds, but via surgical implants, could be switched to remote control whenever the aliens so desired. And now, thought Buck, I am one of those human robots.

The sound of the cell door opening made Buck jump to his feet. A massive Klaxon guard motioned Starton to follow him. Buck tried to form a rebelling thought, but could not. They were testing their new toy. Following sluggishly behind, Buck was led into the Great Central Chamber of the Klaxon ruler.



He walked with spastic jerks to the ornate throne where the ruler sat watching with a grin on his ugly face. As Buck stood, intimidated, the king spoke.

"You are not cooperating!" he said in a gruff voice. "If you wish to live, you will not fight it human."

Buck tried to raise his hand to strangle the repugnant creature, but the increased pain emanating from the implant threw him to the ground. He found that if he relaxed the pain subsided. For the remeinder of the Klaxon ruler's talk he stood motionless.

"I have a very important mission for you, my feisty human. Before we made our unfortunate error in the battle of Orion, we learned of a human-designed super dreadnaught for their navy. From what we have learned, it is the most powerful ship in the galaxy. And I want it! With it I will be able to take my rightful place as master of the galaxy. Then I will eradicate you puny humans once and for all!"

Buck leaped at the crazed alien. He got within inches before he was struck down by an alert guard's stun beam. He smiled as he sunk into unconsciousness: He had taken an action too fast for the controllers of his mind. Maybe he could escape.

He awoke aboard a tiny robot ship flying through the cosmos at ultra-light velocity. He was alone with only the ship's central computer as a companion. The master control panel was covered and stripped bare, except for a single red button. Figuring he had nothing to lose he pushed it. The Klaxon ruler's voice then emanated from the

plastoid walls around him.

"Hope you enjoyed your nap my puny friend. Now, about your mission." Buck sank into the only seat on the ship with his head in his hands. The voice continued:

"The plans for this magnificent dreadnaught are contained on a data wafer stored on the small planet Algar V. Here the total collection of human knowledge is kept in a building called Memory Alpha, whatever that means. Get into this structure and steal that data wafer. You will find a few small weapons at your disposal. You will be given a printout of the life forms inhabiting Algar V. Study it carefully."

The voice paused as a sheet of paper crawled out of a slot beneath the console. The Almighty Ruler of Klaxon continued:

"Remember Earthman, we are watching you. Should you try to escape, or let the humans on Algar V know of your mission, you will be extinguished instantly! Should you complete your mission, you will be picked up and delivered to me. Good luck human."

Buck rolled his eyes in disgust. "Oh well," he muttered, "might as well try it." He wondered if that was his thought or an implanted one.

For three days Buck travelled through space until the ship finally descended onto Algar V. It was dark. The planet had recently started its 12-day period of night.

Buck looked at his small inventory of supplies—a strange selection indeed. According to the digital display on the hand laser he was only given 10 shots. He clipped a small grapefruit-sized grenade to his coveralls. It had been stolen from a terrestrial starship. Buck recognized the L.G.E. (low ground effect gre-

A$	—	Message output
AC	—	Front door open/shut flag
B	—	String variable for general input
C	—	Main command input string
CC	—	String matrix for life form names
CO	—	String matrix for object names
D	—	String matrix for location descriptions
D1	—	Location code. First letter is description, second is direction
D2	—	General string manipulation
D3	—	" " "
D6	—	" " "
DA	—	" " "
DB	—	" " "
DP	—	" " "
E1	—	East direction flag
EP	—	Your experience points
ER	—	Poison flag
FS	—	Your strength points
GA	—	Guard attack flag
I	—	General loop variable
J	—	" " "
K	—	" " "
L	—	Creature number
LF	—	Creature location matrix
LS	—	Light status flag
N1	—	North direction flag
NB	—	Number of barbarians
ND	—	Number of dead bodies
NG	—	Number of robot guards
NM	—	Number of minutes of torch light
NS	—	Number of shots in laser
NT	—	Number of computer technicians
O	—	Object location matrix
PL	—	Your present location
Q	—	CHR$(34) variable
RF	—	Robot follows flag
S1	—	South direction flag
SB	—	Tech's box activated flag
UC	—	Chameleon man camouflaged flag
W1	—	West direction flag
X	—	General purpose
Y	—	General purpose
YG	—	Fall in darkness flag
YS	—	Matrix for location and type of dead body
Z	—	General purpose

Table 1. Variable List

Announcing

LOG

ELECTRONIC NOTEBOOK

A totally new concept in small scale information management for the TRS 80 (R). LOG is an assembly language utility which fills the gap between text editors and data base managers to provide a true free form information storage and retrieval system with unheard of ease of operation.

LOG-CMD creates on a formatted diskette a LOG file from 1 to 170 pages long, each page containing 1 full screen of information. Pages are accessed individually or sequentially, as if thumbing through a book. Information is added, updated or deleted from each page in free form by an integral cursor oriented text editor. Each diskette becomes a separate organized notebook to use and re use as you please.

Insert, Delete, Tab, Clear, and full cursor positioning are supported, as well as blinking cursor and auto repeat. All functions operate with the ease of a single keystroke including Global Search. Output to printer is provided. LOG can even be accessed from BASIC without loss of program.

Why, when you own a computer, do you still keep records by hand? Throw away your pencil and paper! Use your computer as you never dreamed of before!

Model I	32 or 48K	$44.95	(uppercase only)
Model III	32 or 48K	$49.95	(uppercase/lowercase)

(minimum system: 32K, 2 disk drives DOS 2.3 (I) or 1.3 (III) required)

Write or Call for further information

KSoft
318 Lakeside Drive
Brandon, MS 39042

(601) 992 2239

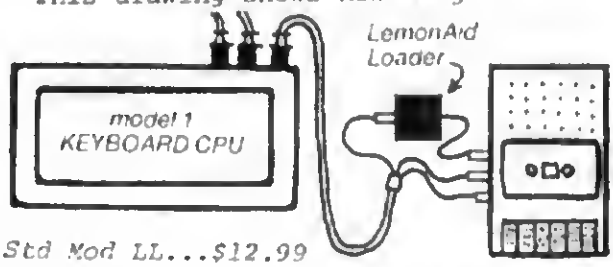
MasterCard and Visa accepted
MS Residents pay 5% sales tax
We pay shipping and handling

(TRS 80 is a trademark of Tandy Corporation)

331

"UN-FINICKY-CIZE" TAPE LOADS
...in seconds.
Just plug in a LemonAid Loader

This drawing shows how easy it is....



Std Mod LL...$12.99
Deluxe LLO...$18.99

CTR 80, 80A, 41, 43, etc.

OUR MONEY BACK GUARANTEE. No loader at ANY price is so easy to install, so easy to use, or makes SYSTEM and CLOADS so reliable. And it works for high speed KWICOS* too!

As COMPUTRONICS magazine says: "turn recorder volume full up and the little box does the rest ... remarkable."

Two models. Take your pick to take the load off your mind. Complete. Nothing else to buy.

Model LL (the original) SIMPLY a great loader for either self-saved or pre-recorded tapes $12.99

Model LLO. All the features of model LL plus has quick change over switch for pre-recorded tapes. And another plus ... a loud speaker/earphone jack with built in volume trimmer for automatic save/load monitoring, for pre-positioning tape, and for hearing game and other computer sound effects with or WITHOUT a separate amplifier $18.99

Send cash, check, M.O., or charge card No. and exp. date (MC or VISA) $3.00 extra for COD or overseas orders. Other orders postpaid. Order by model as listed above.

LEMONS TECH SERVICES
325 N. Hwy. 65 PO Box 0429
Buffalo, MO 65622

CALL (417) 345-7643 (UNTIL 10 PM) FOR ORDERS, INFORMATION

*Trademark KW's Software, Box 328, Bowser, MO 65413

368

See List of Advertisers on page 338

nade) as being one of the experimental models produced at Rigel War Laboratories during the conflict. They were too sensitive and had to be discontinued. The Klaxons had also given him a standard electrotorch for light. Equipment in hand, Buck leaped onto the surface of Algar V to begin his mission...

The Program

The program's modular form allowed me to create a central command input section in lines 60-210 to branch to the various routines to handle the ection of the adventure. Since the Search ...Compare section looks for keywords, the player is not restricted to one or two-word commands.

Once a particular subroutine has completed its action, it jumps back to line 60 where flags are checked and the status of certain individual items are changed and acted upon.

For instance, in line 70 strength points are decreased with the passage of a turn. Then it is checked to see if you are getting weak or have fallen unconscious. In line 150 the program waits for you to enter data.

Some of the creatures will be more apt to follow you than others. This happens in the move section at lines 330-640. You can change the possibility of an encounter by changing the RND statements in lines 410-440.

How to Modify

You can also change the number of each different type of life form by changing the variables in line 40 to whatever you desire. Remember to keep the game within reasonable limits. If you were to place 100 robot guards on the planet, your chances of survival would be mighty slim.

Try the game as is and then, if you like, use the variable list (Table 1) and the Program Listing to customize the adventure to your own taste.■

L.L. Myers serves aboard a nuclear submarine in the US Navy.

ATTENTION!

All Radio Shack Line Printer

'VI I and 'VI I I owners

Utilize the GRAPHICS capabilities of these printers to the maximum with our

CHARACTER GENERATOR-

Allows you to generate any special character you wish for use in your own programs with ease! Generate symbols such as ▯,ㄇ,Ψ,≪,※,三,▪,◡,▯,Radio Shack and save them to cassette or disk for easy retrieval.

PICTURE GENERATOR-

Allows you to draw pictures on the screen and print them normal size, or enlarged 1 or 2 times!! Also, you can save your pictures for use over and over!

	Cass	Disk
Character Generator-----	24.95	29.95
Picture Generator-------	24.95	29.95

Available for Model I/III 16K Cassette 32K 1 Disk Drv.

Send Check or Money Order to:

PROGRAMS FOR THE 80's

P.O. Box 50160/Indianapolis, IN/46250

Radio Shack is a trademark of Tandy Corp.

Program Listing

```
1@ CLS:CLEAR200:RANDOM:POKE16553,255:DEFSTRC,Q,D,B:DEFINTA,E,S,Y
,I,J,K:READD1:DINC1(20),C(36),LF(5),D(4),CC(5),CO(4),D(13),YS(11
,1),D6(5):Q=CHR$(34)
2@ PRINT@18,"CONQUEST OF MEMORY ALPHA":PRINT:PRINT"  AS YOU EXIT
 FROM THE TINT ROBOT SHIP YOU WONDER JUST HOW YOU  CAN POSSIBLY
GET INTO THE BUILDING OF ";Q;"MEMORY ALPHA";Q;".":PRINT"LOOKING
BACK OVER YOOR SHOULDER YOU SEE THE BLAST OF THE ENGINE"
3@ PRINT"AE YOOR SHIP LIFTS OFF TO WAIT FOR YOO IN ORBIT. THEN Y
OU ARE   PLUNGED INTO DARKNESS ON THE PLANET!":PRINT:LF(1)=18:LF
(2)=2:LF(3)=11:LF(4)=20
4@ FORI=1TO36:READC(I):NEXT:FORI=0TO13:READD(I):NEXTI:FORI=0TO5:
READCC(I):NEXT:FORI=0TO4:READCO(I):NEXTI:O(1)=100:O(2)=100:O(3)
=100:NS=10:NT=2:NG=6:NR=3:NB=2:NM=75:LF(5)=43:O(0)=37:LF(0)=47:E
P=10:FS=46:SD=1:O(4)=RND(99)
5@ GA=0:FORI=0TO5:READD6(I):NEXT:LS=0:KB=0:ND=0:FORI=1TO4:LF(I)=
100:NEXTI:PRINT"YOU ARE PRESENTLY ON A DARK PLANET.":GOTO60
6@ IFLF(1)=PLANDGA=1ANDLS=1THENL=1:GOTO79@ELSEIFLF(1)=PLANDLS=1A
NDRND(12)>10THENL=1:GOTO79@
7@ FB=FS-.5:IFFS<8ANDFS>4THENPRINT"YOUR GETTING VERY WEAK. YOU N
EED FOOD!":ELSEIFFS<1THENPRINT"YOU HAVE FALLEN UNCONCIOUS FROM L
ACK OF STHENGTH!":GOTO143@
8@ IFLS=1THENNM=NM-1:IFNM<4THENPRINT"YOUR ";CO(1);"'S BATTERIES
ARE GETTING VERY WEAK!":IFNM<1THENPRINT"YOUR ";CO(1);" DIMS AND
GOES OUT.":LS=0
9@ IFO(0)=10@ANDPL=LF(5)ANDRND(6)>4THEN142@
10@ IFO3="A"ANDO(0)=10@THEN149@
11@ IFLF(3)=PLAND(KB=10RRND(12)>0)THENL=3:GOTO89@
12@ IFO(0)=10@ANDLF(0)=PLANDSB=1RNDRND(6)>3THENPRINT"THE ";CC(0)
;" PRESSES A BUTTON ON THE BOX!  OH NO!":GOTO152@ELSEIFO(0)=10@A
NDLF(0)=PLANDRND(20)>18THENA$="WATCH OUT! THE TECH HAS PRESSED A
 HIDDEN SWITCH!":GOSUB147@:GOTO152@
13@ IFER=1ANDRND(2000)=199THENA$="YOU ARE GETTING VERY FEVERISH!
":GOSUB147@:A$="YOO ARE SLOWLY BEING POISONED BY THE RAT YOU EAT
!":GOSUB147@:ER=5
14@ IFER=5THENSF=SF-2:IFSF<2THENA$="THE POISON HAS MADE YOU FALL
 UNCONCIOUS!":GOSUB147@:A$="YOUR BODY QUIVERS AND DIES!":GOSUB14
7@:GOTO143@
15@ C="":X=0:C1(0)="":INPUTC:IFC=""THENPRINT"NEAT?":GOTO15@ELSEF
ORI=1TOLEN(C):B=MID$(C,I,1):IFB=" "ORB="'"ORB="."ORB="!"ORB="?"O
RB=";"ORB=":"THENX=X+1:C1(X)="":GOTO17@
16@ C1(X)=C1(X)+B:IFX=2@THENPRINT"TOO MANY WOROS!":GOTO15@
17@ NEXTI:FORI=0TOX:B=C1(I):IFLEFT$(B,5)="KLAKO"THEN152@
18@ FORJ=1TO36:IFB=C(J)THEN21@ELSENEXTJ
19@ NEXTI
20@ PRINT"I DON'T KNOW HOW TO ";Q;C;Q:GOTO60@
21@ ONJGOTO33@,330,33@,330,33@,336,336,33@,320,31@,31@,286,28@,6
78,676,82@,82@,91@,91@,91@,96@,96@,46@,46@,65@,65@,111@,111@,12@
0,12@@,128@,128@,135@,144@,137@,139@
22@ PRINT"YOU OON'T HAVE IT!":EP=EP-1:GOTO60
23@ PRINT"YOU CAN'T OO THAT...YET!":GOTO60
24@ PRINT"IT'S ALREADY ";B;"!":EP=EP-1:GOTO60
25@ PRINTB;" WHAT?":GOTO60
26@ PRINT"WHAT ";B;"?":GOTO60
27@ PRINT"OON'T BE RIDICULOUS!":GOTO60
28@ IFO(1)<1@@THEN22@ELSEIFLS=0THEN24@ELSEPRINT"YOUR ";CO(1);" I
S NOW ";B:LS=0:GOTO60
29@ IFRND(18)>6PTHENX=1:RETURNELSEX=0:RETURN
30@ IFRND(22)>FSTHENX=1:RETURNELSEX=0:RETURN
31@ IFO(1)<1@@THEN22@ELSEIFLS=1TBEN24@ELSEIFNM<1THENPRINT"THE BA
TTERIES ARE DEAD.":GOTO60ELSEA$="YOUR "+CO(1)+" IS NOW ON. THE G
LOW SPREADS OOT OVER THE":GOSUB147@:A$="DRSOLATE ALIEN PLANET.":
GOSUB147@:LS=1:GOTO47@
32@ IFSD>0THENPRINT"STRANGE...IT WON'T BUDGE.":GOTO60ELSEPRINT"T
HE DOOR OPENS!":AC=1:GOTO60
33@ IFLS=0THENPRINT"THE PLANET IS DARK. YOU CAN'T SEE ANYTHING!"
:YG=YG+1:IFYG>3THENPRINT"YEEOOOW! YOU FELL INTO A DEEP RAVINE!":
GOTO143@ELSEGOTO60
34@ B=LEFT$(B,1):IF(B="N"RNDN1=0)OR(B="W"ANDW1=0)OR(B="S"ANDS1=0
)OB(B="E"ANDE1=0)THENPRINT"IMPOSSIBLE TO GO THAT DIRECTION.":GOT
O60
35@ IFPL=43ANDAC=0ANDB="W"THENPRINT"THE MASSIVE FRONT DOOR IS ST
ILL CLOSED.":GOTO60
36@ IFLF(5)=PLTHENPRINT"THE ";CC(5);"'S LASER CANNON REVOLVES TO
 FOLLOW YOU.":IFRND(12)>10THENL=5:GOTO79@
37@ FORI=1TO4:IFLF(I)=38@THENNEXTELSEIFLF(I)>499THENNEXTELSEIFLF
(I)<>PLANDRND(12)>6THENLF(I)=100:NEXTIELSENEXTI
38@ RF=0:IFLF(1)=PLANDRND(6)>2THENPRINT"THE ROBOT LOOKS AT YOO K
IND OF FUNNY AND FOLLONS YOU.":RF=1
39@ FB=0:IFLF(3)=PLANDRND(6)>4THENFB=1
40@ IFB="N"THENPL=PL-10ELSEIFB="W"THENPL=PL+1ELSEIFB="E"THENPL=P
L+10ELSEIFB="S"THENPL=PL-1
41@ IFLF(0)=10@ANDNT>0THENIFRND(12)=8THENLF(0)=PL:NT=NT-1
42@ IFLF(1)=10@ANDNG>0THENIFRND(12)>7THENLF(1)=PL:NG=NG-1
43@ IFLF(2)=10@AKDNR>0THENIFRND(12)>6THENLF(2)=PL:NB=NB-1
44@ IFLF(3)=10@AKDNB>0THENIFRND(12)>8THENLF(3)=PL:NB=NB-1
45@ GOTO47@
46@ IFK>8THEN97@
47@ IFLS=0THEN33@ELSEFORI=1TO9:PRINT:NEXTI:A=PL*2+1:DP=MID$(D1,A
,2):D2=LEFT$(DP,1):D3=RIGHT$(DP,1):PRINT@448,CHR$(31);PRINT@576,
"YOUR PRESENT LOCATION : THE ";D(ASC(D3)-65);".":PRINT"POSSIBLE
DIRECTIONS : ";:N1=0:S1=0:E1=0:W1=0:A=ASC(D2)-65
48@ IFA=0THENN1=1ELSEIFA=1THENW1=1ELSEIFA=2THENS1=1ELSEIFA=3THEN
E1=1ELSEIFA=4THENN1=1:E1=1ELSEIFA=5THENN1=1:W1=1ELSEIFA=6THENN1=
1:S1=1ELSEIFA=7THENE1=1:W1=1ELSEIFA=8THENE1=1:S1=1ELSEIFA=9THENS
1=1:W1=1ELSEIFA=10THENN1=1:W1=1:S1=1
49@ IFA=11THENN1=1:W1=1:E1=1ELSEIFA=12THENN1=1:E1=1:S1=1ELSEIFA=
13THENE1=1:W1=1:S1=1ELSEIFA=14THENN1=1:W1=1:E1=1:S1=1
50@ IFN1=1THENPRINTC(5);" ";
51@ IFW1=1THENPRINTC(6);" ";
52@ IFS1=1THENPRINTC(7);" ";
53@ IFE1=1THENPRINTC(8);" ";
54@ PRINT:IFRF=1THENLF(1)=PL:IFRND(20)>17THENL=1:GOTO79@
55@ X=0:PRINT"LOOKING AROOND, YOU CAN SEE :":FORI=0TO3:IFPL=LF(I
)THENPRINT"A ";CC(I);".":X=1:NEXTELSENEXT
56@ IFPL=LF(4)ANDUC=0THENPRINT"A ";CC(4);".":X=1
57@ IFPL=LF(5)THENPRINT"A SINISTER LOOKING ";CC(5);".":X=1
58@ FORI=0TO4:IFPL=O(I)THENPRINT"A ";CO(I);".":X=1:NEXTELSENEXT
59@ IFND>0THENPORI=0TOND-1:IFPL=YS(I,1)THENPRINT"A DEAD ";CC(YS(
I,0));".":X=1:NEXTELSENEXT
```

Program continues

DISK DRIVES

FROM: **SIEMENS**
NEW PRICES
EFFECTIVE NOW

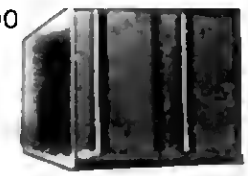
HARD DISKS & FLOPPIES FOR YOUR HEATH, RADIO SHACK, OSI & S-100 SYSTEMS

EXACT REPLACEMENT OR ADD-ON HEATH DISK DRIVES NOW AVAILABLE

WE HAVE ADD-ON 5¼"DISK DRIVES FOR THE IBM PERSONAL COMPUTER

5¼ DISK DRIVES (MODEL FDD-100-5b) *for Heath, RS MOD I, S-100, N. Star & more*

SIEMENS 5¼" drives are single sided, single or double density drives that are designed for years of trouble free service. These are the flippy models which other companies charge 15 to 30 dollars more for. The 5¼" is the exact same one used in the HEATH systems, but check our price!. NOW $240.00



5¼" WITH CASE AND POWER

Our 5¼" drives are also available in system packages. One 5¼" flippy in case with power supply tested $285.00
2 drives in dual case $585.00

80 TRACK - DOUBLE SIDED 5¼" *for Heath, CDR, RS MOD III, S-100 & more*

A new product from SIEMENS. This beauty is a new entry to the Floppy market. Get up to 800K Bytes storage on a 5¼" diskette. Model #FDD-221-5 ..... NOW$350.00 ea.

PACKAGE DEAL 80 TRACK 5¼"

1 dual sided 80 track drive *(in case with power supply)* $395. Two 80 track double sided *(in one enclosure)* $795.

8" FLOPPY DISK DRIVES (MODEL FDD-100-8d) *for Heath, OSI, S-100, RS MOD II & more*

SIEMENS 8" drives are single sided, single or double density with simple power requirements. +24 and +5 VDC. It has automatic diskette ejection and a fail safe interlock that prevents the door from closing on a partially inserted diskette. The track to track time is as fast as 4ms. These drives are completely compatible with your MOD II, OSI, and many other systems ..... NOW $340.00 ea.

8" SYSTEM PACKAGES

One or two 8" SIEMENS drives with cabinet (choice of vertical or horizontal) power supply, all power connections, manuals and fan. A beautifully functional package built only of the best grade components. Available fully assembled and tested for $100.00 more.

Single 8" drive in dual cabinet ..... (data cables extra) $650.00
Dual drive package ..... (data cables extra) $980.00

ATTENTION HEATH H-88, 89 OWNERS

HEATH owners, we now have the CDR controller card that allows you to use our 8" drives on the H-88 or H-89 computers! You may mix any combination of 8" or 5¼" drives and also change your system to soft sectored formatting! Mix any combo single sided, double sided, single density or double density. We even include the zero origin prom. As a special offer we are giving you ALL necessary components with this system, even the patch for C/PM!

CONTROLLER ONLY
450.00

A complete dual 8" system for the H-88 or H-89 ..... $1450.00
Dual 5¼" 40 track system *with controller* $1050. Dual 5¼" 80 track system *with controller* $1250.

WINCHESTER TECHNOLOGY HARD DISK SYSTEMS

5 or 10 MEGABYTE Hard Disk systems for your HEATH H-88, 89, Radio Shack Mod I, II or III, Apple, IBM, or any S-100 system! You get a 5 or 10 megabyte formatted hard disk, power supply, cabinet, all interfacing cables, and CP/M boot loader. Most of all its all factory preassembled and tested, burned in and ready to run! You even get a real time clock (except HEATH). Built only of commercial grade components. ..... JUST $2400. 5mb and $2700. 10mb

quantity discounts available some of the 8" packages require assembly...we carry parts for siemens

PAYMENT POLICY
We accept Mastercard, Visa, personal checks & MO. We reserve the right to wait 10 working days for personal checks to clear your bank before we ship. All shipping standard UPS rates plus insurance. NJ residents must add 5% sales tax

FLOPPY DISK SERVICES, INC

C.N.5212
PRINCETON, NEW JERSEY 08540

PHONE INQUIRIES WELCOME 9AM to 5PM (ET)
609-771-0374 ✓267

PRICES & SPECIFICATIONS SUBJECT TO CHANGE

MOD II, CP/M are trademarks of Tandy and Digital Research respectively

✓See List of Advertisers on page 338

Program continued

```
60 IFLF(2)-5=0:PLTHENPRINTCC(2);" BONES."ELSEIFX=0THENPRINT"NOT
EING."
61 IFFB=1THENLF(3)=FL:PRINT:FB=0:A$="THE "+CC(3)+" WALKS UP BEH
IND YOU!":GOSUB147
62 IFLF(3)=PLANDKB=1THENPRINT"THE ";CC(3);" HAS HEARD ABOUT YOU
 KILLING HIS BROTHER!":KB=0:L=3:GOTO59
63 IFFL=4THENPRINT"THE FRONT DOOR TO ";Q;"MEMORY ALPHA";Q;" IS
 TO THE WEST OF YOU."
64 GOTO6
65 PRINT"YOU HAVE";FS;"STRENGTH POINTS AND";EP;"EXPERIENCE POIN
TS.":PRINT"YOU ARE PRESENTLY CARRYING :";FORI=0TO4:IFO(I)=1THE
NPRINT"A ";GO(I);:IFI=2THENPRINT" WITH";:NS;"SHOTS LEFT."ELSEIFI=
1THENPRINT" WITH";MN;"MINUTES LEFT."ELSEPRINT"."
66 NEXTI:IFLF(2)=3THENPRINT"A D&D ";CC(2);".":GOTO6:ZLSEGOTO
6
67 IFNS<=0THENPRINT"YOUR CHARGE IS GONE!";GOTO6:ELSEGOSUB118:I
FL=5ANDPL<>LF(5)THENL=1:ELSEIFL=8THENNS=NS-1:PRINT"YOU FIRE AT TH
E STRANGE RETAL DOOR.":GOTO72
68 IFLF(L)<>PLTHEN26:ELSEPRINT"A POWERFUL BLAST OF ENERGY ERUPT
S FROM YOUR WEAPON!";NS=NS-1
69 IFL<5ANDL<>1THENGOSUB29:IFX=8THENEP=EP+2:GOTO73:ELSZEP=EP-1
:GOTO75
70 IFL=1THENGOSUB29:IFX=1:ENEN78:ELSEIFRND(6)=3THEN78:ELSEGOTO7
3
71 IFL<>5THEN77:ELSEIFRND(3)>2:THEN73:ELSEPRINT"BUT THE ARMOR
PROTECTS THE ";CC(L):GOTO79
72 IFL=6ANDPL<>4:THEN26:ELSEIFSW<1THENPRINT"THE DOOR SEEMS TO C
RUMBLE ALITTLE.":GOTO6:ELSEPRINT"THE DOOR GLOWS RED BUT SEEMS TO
 ABSORB THE ENERGY.":SD=SD-1:GOTO6
73 IFAND(6)=LTHEN86:ELSEPRINT"RND VAPORIZES THE ";CC(L):LF(L)=1
:
74 IFL=3THENEB=1:A$="YOU HEAR A WARLIKE CRY IN THE DISTANCE!":G
OSUB147:GOTO6:ELSEIFL=1ANDGA=0THENA$="YOUR IMPLANT BEEPS AS THE
 GOARDS ARE ALERTED OF AN INTRUDER!":GOSUB147:GA=1:GOTO6:ELSEGO
TO6
75 IFL>0ANDRND(12)>6THENPRINT"THE ";CC(L);" RUNS FROM YOU!":LF(
L)=RND(99):GOTO6
76 IFL=2ANDAND(12)>1:THENPRINT"THE ";CC(L);" BITES YOU!":FS=FS-
8:GOTO6:ELSEIFL=0ANDRND(12)-11THENPRINT"THE ";CC(L);"REACHES INT
O HIS POCKET AND PULLS OUT A SMALL BAG!":SB=1:GOTO6
77 PRINT"AND YOU MISS EVERYTHING!":GOTO6
78 PRINT"BUT THE BEAM MISSES THE ";CC(L);"!":IFRND(12)>6THEN79:
ELSEIFAND(12)=5THENPRINT"THE ";CC(L);" MOVES AWAY FROM YOU.":GOT
O81:ELSEGOTO86
79 PRINT"YOU ARE SHOT AT BY THE ";CC(L);"!":GOSUB29:IFX=1ORL=5
THENA$="BUT YOU DODGE THE SEARING BLAST!":EP=EP+1:GOTO7
3
80 IFAND(2)>FSTSENPRINT"THE BEAM CUTS RIGHT THROUGH YOU!":GOTO
33:ELSEPRINT"AND YOU ARE BURNED BY THE BEAM!":FS=FS-1:GOTO7
81 IFFL>9THENLF(L)=LF(L)-1:GOTO6:ELSELF(L)=LF(L)+1:GOTO6
82 IFFS<4THENPRINT"YOU HAVEN'T ENOUGH STRENGTH TO GO BATTLE!":G
OTO6:ELSEGOSUB118:IFLF(L)<>PLTHEN26:ELSEIFL=5ANDPL<>LF(5)THENL=
1:ELSEIFL=5THEN27
83 PRINT"YOU SWING A POWERFUL RIGHT ARM!":IFL=2ANDAND(12)>4THEN
88:ELSEIFL=2THENPRINT"BUT THE LITTLE RASCAL IS TO FAST!":GOTO75

84 IFL=1ANDAND(2)>1:ETHEN88:ELSEIFL=1THENPRINT"BUT YOU MISS!":G
OTO79
85 IFL=3ANDRND(2)>1:THENKB=1:GOTO88:ELSEIFL=3THENPRINT"AND YOU
 MISS THE ";CC(L):GOTO89
86 IFL=4ANDRND(12)>9THEN88:ELSEIFL=4ANDRND(12)>1:THENPRINT"AND
THE ";CC(L);" HAS CAMOFLAGED HIMSELF!":PRINT"YOU CAN'T SEE HIM!"
:GOTO98:ELSEIFL=4THEN75
87 IFL=8ANDRND(12)<7THEN7
88 PRINT"YOU HAVE KILLED THE ";CC(L);".":YS(ND,8)=L:YS(ND,1)=PL
:ND=ND+1:LF(L)=100:GOTO74
89 IFRND(12)>4THENPRINT"THE ";CC(L);" SWINGS AT YOU!":GOSUB38:
IFX=1THENPRINT"AND POLVERIZES YOU!":GOTO143:ELSEPRINT"BUT YOU DO
CK UNDER IT!":EP=EP+1:GOTO6:ELSEGOTO6
90 IFRND(12)>8THENLF=AND(99):GOTO6:ELSEUC=1:GOTO6
91 FORL=1TO5:IFPL=LF(L)THEN92:ELSENEXTL:PRINT"NO RESPONSE.":GOT
O6
92 IFL=1THENPRINT"THE ";CC(1);" SAYS IN A METALLIC VOICE :":PRI
NTQ;"SHOW PROPER IDENTIFICATION PLEASE!";Q:IFRND(12)>1:THEN79:EL
SEGOTO6
93 IFL=8ANDSB=1THENPRINT"THE ";CC(L);" YELLS : ";Q;"NO MORE!";Q
:PRINT"AND HE PRESSES THE BUTTON ON THE BOX!":FORI=1TO9:NEXTI:
PRINT"YOU ARE SUDDENLY DIZZY AND EVERYTHING BLURS!":GOTO152
94 IFL=8THENPRINT"THE ";CC(8);" SAYS TO YOU :";PRINTQ;"MAY I BE
LP YOU?";Q;" BUT HE DOESN'T SEEM TO BE LISTENING!":IFAND(12)>1:T
HENPRINT"EE PULLS SOMETHING OUT OF HIS POCKET. ALITTLE BOX.":SB=
1:GOTO6:ELSEGOTO6
95 PRINT"THE ";CC(L);" JUST GLARED AT YOU!":IFL<>2THEN89:ELSEPR
INT"AND THEN IT RUNS AWAY!":LF(2)=AND(99):GOTO6
96 IFX=8THEN25:ELSEFORX=ITOX:B=C1(X):IFB="AREA"ORB="ROOM"ORLEFT
$(B,4)="ROUN"ORLEFT$(X,4)="PLAI"ORLEFT$(B,4)="HALL"THEN97:ELSEIF
LEFT$(B,4)="GUAR"ORB="TANK"ORB="BODY"THEN:166:ELSEIFB="DOOR"THEN1
18:ELSENEXTK:GOTO28
97 IFO1="":THENPRINT"YOU CAN'T SEE ANYTHING!":GOTO5:ELSEA$="YOU
START LOOKING AROUND. YOU SEE...":GOSUB147:A=ASC(D3)-65:IFA>5TH
EN118:ELSEFORE=1TOLEN(D6(A))STEP2:Y=VAL(MID$(D6(A),E,1)):E=VAL(N
ID$(D6(A),E+1,1)):GOSUB148:NEXTK
98 FORE=0TO4:IFPL=LF(X)THENA$="A "+CC(E)+" RIGHT NEXT TO YOU! L
OKING YOU OVER.":GOSUB147:NEXTNELSENEXTN
99 FORE=0TO4:IFPL=O(E)THENA$="A "+CO(E)+" HERE.":GOSUB147:NEXT
KELSENEXTK
100 PRINT:IFA=4THENPRINT"YOU ALSO SEE ";Q;"MEMORY ALPHA";Q;" HE
RE.":GOTO6:ELSEGOTO6
101 DA="DOORWAY":IFA=6THENDB=C(7)+C(6):GOSUB105:ELSEIFA=7THENDB
=C(5)=C(8):GOSUB105:DB=C(5)+C(6):GOSUB105:DB=C(7)+C(6):GOSUB1
50:DB=C(7)=C(6):GOSUB105:ELSXIFA=8THENDB=C(8):GOSUB105:DB=C(5):
GOSUB105
102 IFA=8THENDB=C(7):GOSUB105:DB=C(8):GOSUB105:ELSEIFA=1:THEND
B=C(6):GOSUB105:DB=C(5):GOSUB105:ELSEIFA=11THENDB=C(7):GOSUB105
:ELSEIFA=13THENDB=C(8):GOSUB105:ELSEIFA=13THENDB=C(8):GOSUB105:
GOTO6:ELSEGOTO6
103 GOTO6
104 IFY=1ORY=5THENA$=D(Y)+" TO THE "+C(X)+".":GOSUB147:RETURNE
LSEA$="A "+D(Y)+" TO THE "+C(X)+".":GOSUB147:RETURN
105 A$="THERE IS A "+DA+" ON THE "+DB+" WALL.":GOSUB147:RETURN
106 IFLF(1)=PLTHENPRINT"THE ";CC(1);" WON'T LET YOU!":L=1:GOTO7
9:ELSEFORI=0TOND-1:IFYS(I,8)=1ANDYS(I,1)=PLTHEN109:ELSENEXTI
107 IFLF(5)=PLTHENPRINT"THE TANK IS STILL ACTIVE!":L=5:GOTO79
108 FORI=0TOND-1:IFYS(I,8)>2ANDYS(I,8)<5ANDYS(I,1)=PLTHENPRINT"
YOU FIND NOTHING ON THE ";B;".":GOTO6:ELSENEXTI:GOTO26
109 IFO(4)<1:THENPRINT"YOU SEE A ";CO(4);" HERE.":O(4)=PL:EP=E
P+2:GOTO6
110 IFFL<>43THEN26:ELSEPRINT"YOU SEE A LEVER AND A SMALL SLOT N
EXT TO THE DOOR.":GOTO6
111 GOSUB116:IFL>4THEN112:ELSEIFO(L)<>PLTHEN26:ELSEO(L)=100:GO
TO114
112 IFLF(2)=3:THENPRINT"YOU ALREADY HAVE ONE.":GOTO6:ELSEPOSI=
0TOND-1:IFYS(I,8)=2THENYS(I,8)=8:LF(2)=3:GOTO115:ELSENEXTI
113 IFLF(2)=PLTHENPRINT"MAYBE YOU BETTER KILL IT FIRST!":GOTO6
:ELSEIFLF(2)-5=0:PLTHENPRINT"THE BONES DISSOLVE AS YOU TOUCH THEN
I":LF(2)=1:GOTO6
114 PRINT"YOU NOW HAVE THE ";B;".":IFL=3ANDRND(50)>45THENPRINT"
THE ";GO(L);" HAS DETONATED IN YOUR HANDS!":GOTO143:ELSEGOTO1:6
115 FORJ=ITOND-2:YS(J,8)=YS(J+1,8):YS(J,1)=YS(J+1,1):NEXTJ:ND=N
D-1:GOTO114
116 IFX=8THEN25:ELSEFORE=ITOX:B=C1(X):IFB="DATA"ORB="WAFER"THEN
L=8:RETURNELSEIFB="TORCH"ORB=CO(1)THENL=1:RETURNELSEIFB="LASER"O
RB="WEAPON"ORB="GUN"THENL=2:RETURNELSEIFB="GRENADE"ORB="BOMB"THE
NL=3:RETURN
117 IFB="CARD"ORB="PLASTIC"THENL=4:RETURNELSEIFB="RAT"ORB="ALGA
RIAN"THENL=5:RETURNELSENEXTK:IFJ<2THEN27:ELSEGOTO22
118 IFX=8THEN25:ELSEFORE=ITOX:B=C1(X):IFLEFT$(B,4)="TECH"ORLEFT
$(B,4)="COMP"THENL=6:RETURNELSEIFB="GUARD"THENL=1:RETURNELSEIFB=
"RAT"ORB="ALGARIAN"THENL=2:RETURNELSEIFLEFT$(B,4)="BARB"THENL=3:
RETURN
119 IFB="DOOR"THENL=8:RETURNELSEIFLEFT$(B,4)="CHAR"ORB="MAN"THE
NL=4:RETURNELSEIFB="TANK"ORB="ROBOT"THENL=5:RETURNELSENEXTK:GOTO
28
120 GOSUB116:IFL>4THEN121:ELSEIFO(L)<1:THEN226:ELSEO(L)=PL:GOT
O122
121 IFLF(2)<3:THEN228:ELSEYS(ND,8)=2:YS(ND,1)=PL:LF(2)=100:ND=N
D+1
122 PRINT"YOU HAVE NOW DROPPED THE ";B;".":GOTO6
123 DATA JANAANABNBDNBFNBNBNBICANAOAOBOBOBORONCODOOODOELELELE
LEOENCADODODMEJGIGJLJLLEENCKDODODOEOGMGFIIJEMCKDODODMEFGLGNHEIKE
NCKDODODMEBNHNLNDMKENCKDODODOENENEMENEOENCAFKFOFOFOFOFOFOFOMCFF
LFLFLFLFLFLFLFLFEC
124 DATA,N,E,E,NORTH,WEST,SOUTH,EAST,OPEN,ON,LIGHT,OFF,UNLIGHT
,SROOT,FIRK,KILL,ATTACK,ASK,TALK,SAY,SEARCH,EXAMINE,L,LOOK,INVEN
,INVENTORY,GET,TAKE,PUT,DROP,THROW,TOSS,EAT,QUIT,USE,PULL
125 DATALANDING AREA,RED HILLS,MOUNTAIN RANGE,LARGE BLEAK PLAIN
,SECURITY AREA,BLUE HILLS,RECEIVING ROOM,HALLWAY,SUB-COOLING ROO
M,PROCESSING ROOM,SECURITY OFFICE,MAIN COMPUTER ROOM,DATA STORAG
E ROOM #1,DATA STORAGE ROOM #2
126 DATACONPUTER TECH,ROBOT GUARD,ALGERIAN RAT,BARBARIAN,CHANEL
EON MAN,ROBOT TANK,DATA WAFER,ELECTROTORCH,HAND LASER,L.G.E. GRE
NADE,PLASTIC CARD
127 DATA1837,8E2647,1E4858,854657,15265738,354525,
128 IFX=8THEN25:ELSEFORX=ITOX:B=C1(X):IFB="GRENADE"ORB="BOMB"TH
EN129:ELSENEXTK:GOTO128
129 IFO(3)<1:THEN228
130 FORI=ITOX,B=C1(J):IFB="TANK"THEN131:ELSEIFB="GUARD"THEN133:
ELSEIFB="DOOR"THEN134:ELSENEXTJ:B="AT":GOTO25
131 IFLF(5)<>PLTHEN26:ELSEL=5:X=4:GOTO132
132 O(3)=26:PRINT"YOU THROW THE ";CO(3);" AT THE ";CC(L):IFAND
(12)>XTHENPRINT"AND IT EXPLODES! VAPORIZING THE ";CC(L):LF(L)=1
8:GOTO6:ELSEPRINT"BUT IT DIDN'T DETONATE!":O(3)=PL:IFAND(12)>XTH
EN79:ELSEGOTO6
133 IFLF(1)<>PLTHEN26:ELSEL=1:X=5:GOTO132
134 IFFL<>43THEN26:ELSEO(3)=28:PRINT"YOU TOSS THE ";CO(3);" AT
 THE MASSIVE FRONT DOOR.":IFRND(12)>5THENPRINT"AND IT BLOWS IT W
IDE OPEN!":AC=1:GOTO6:ELSEPRINT"BUT IT DIDN'T DETONATE!":O(3)=PL
:GOTO6
135 IFX=8THEN25:ELSEFORX=ITOX:B=C1(X):IFB="RAT"ORB="ALGARIAN"TH
EN136:ELSENEXTK:GOTO27
136 IFLF(2)<3:THEN22:ELSEPRINT"YUM YUM <SIC> YUCK! WELL AT LEA
ST IT HELPED YOUR STRENGTH!":FS=FS+2:LF(2)=50:PL:EN=1:GOTO6
137 IFX=8THEN25:ELSEFORE=ITOX:B=C1(X):IFB="CARD"ORB="PLASTIC"TH
EN138:ELSENEXTK:GOTO26
138 IFO(4)<1:THEN228:ELSEIFFL<>43THEN239:ELSSO(4)=28:PRINT"YOU
 INSERT THE ";CO(4);" INTO THE SMALL SLOT...":EP=EP+3:GOTO6
139 IFX=8THEN25:ELSEFORK=ITOX:IFC1(X)="LEVER"THEN144:ELSENEXTK:
GOTO28
140 IFFL<>43THEN23:ELSEPRINT"YOU PULL THE LEVER.":IFO(4)<>2:THE
NPRINT"BUT NOTHING HAPPENS.":GOTO6
141 IFRND(50)>45PRINT"A WIERD SOUND STARTS COMING FROM WITHIN."
ELSEPRINT"THE MASSIVE DOOR SLOWLY RISES BEFORE YOU!":AC=1:EP=EP+
2:GOTO6
142 IFLF(5)=PLTHENPRINT"THE TANKS CANNON SPINS RAPIDLY AROUND A
ND FIRES A BLAST AT YOU.":PRINT"WHICH VAPORIZES YOU!":GOTO143
143 FORI=1TO100:NEXTI:PRINT"YOU LOSE...":PL=96:GOTO144
144 PRINT"YOU HAD";FS;"STRENGTH POINT AND";EP;"EXPERIENCE POINT
S":PRINT"GO YOU WISH TO PLAY AGAIN (Y/N)"
145 Y$=INKEY$:IFY$=""THEN145:ELSEIFY$="Y"THENRUNELSEIFY$="N"THE
NENDELSEGOTO145
146 FORI=1TO100:NEXTI:PRINT:A$="FROM OUT OF THE HEAVENS YOU SE
E YOUR ROBOT SHIP'S FIERY TRAIL AS IT STOPS NEAR YOU. A SPARODIC
 ROBOT ENERGES FROM THE SHIP AND  DELIVERS A MESSAGE TO YOU :":G
OSUB147:GOTO148
147 FORI=1TOLEN(A$):PRINTMID$(A$,I,1);:FORJ=1TO5:NEXTJ,I:PRINT:
RETURN
148 FORI=1TO5:NEXTI:PRINT"  ";Q;"YOU HAVE BEEN GIVEN ANOTHER
CHANCE. DO NOT FAIL AGAIN!";Q:PRINT:KEYTORK:READD1:GOTO49
149 FORI=1TO80:NEXTI:A$="YOUR SURGICAL IMPLANT BEEPS IN YOUR H
EAD! LOOKING UP YOU SEE A":GOSUB147:A$="FIERY TRAIL AS YOUR SHI
P PREPARES TO LAND.":GOSUB147:IFLF(1)=PLANDRND(12)=4THENPRINT"B
UT THE ";CC(1);" HAS OTHER PLANS!":L=1:GOTO79
150 A$="LOOKING BACK AT "+Q+"MEMORY ALPHA"+Q+" YOU FEEL PROUD Y
OU HAVE YOU":GOSUB147:A$="CONQUERED SUCH A FORMIDABLE OBJECT.":GOSU
B147:A$="SHAKING YOUR HEAD YOU REALIZE THAT THE KLAXONS MUST BE
ALLY BE":GOSUB147
151 A$="TAKING CONTROL OF YOUR MIND.....,":OOSUB147:FORI=1TO50
:NEXTI:GOTO149
152 FORI=1TO5:NEXTI:A$="YOU ARE SUDDENLY TRANSPORTED TO SOMEP
LACE DARK.":GOSUB147:A$="SOMEPLACE VERY COLD.":GOSUB147:A$="SO
MEPLACE THAT IS COMPLETELY SILENT!":GOSUB147:FORI=1TO100:NEXTI

153 CLS:PRINT:PRINT:PRINTCHR$(23);A$="S P A C E  I :":GOSUB147:
FORI=1TO60:NEXTI:CLS:GOTO143
```

SPECIAL GAMES ISSUE
DOUBLE EDITION

Tired of typing in all your programs?

Save time and money!

LOAD 80

ALL THE MAJOR PROGRAM LISTINGS FROM EACH ISSUE OF *80 MICRO*

$17.97

Plus $1.50 ea. Postage & Handling

* SUBSCRIBERS—
An order form will accompany your August 1982 Load 80 disk or cassette, giving you the chance to order your Special Extra Edition of the Games Issue Load 80 at Special Subscriber Prices. Check your package for details.

SAVE HOURS OF TYPING & AGGRAVATION

Sign up for a subscription to LOAD 80. Save up to 30% off the monthly price. Begin your subscription with the August 1982 cassette or disk.*

LOAD 80 disks are TRSDOS 2.3 formatted, single density and flippy-sided. They will not contain an operating system. Single drive users need a single drive copy utility; Model III users need the TRSDOS 1.2/1.3 Convert utility. Source code files may not be useable on the Model III.

"Frankly, after hundreds of hours of frustration, I seldom ever try to keyboard a published program. Inevitably, I mess it up when I keyboard it. Who needs the aggrevation?

"This is why I started a new series of cassettes called **LOAD 80**. Each cassette will have program dumps of the listings in an issue of *80 Micro*. These listings are direct from the authors and tested by the *80 Micro* staff. All but the very short program listings will be on the **LOAD 80** cassettes. Thus, you will be able to save hours of inputting programs and even more of debugging your keyboard errors."

Wayne Green

Wayne Green
Publisher, *80 Micro*

The **LOAD 80** cassette is simply the program listings that appear in the articles in *80 Micro*. It was created to save you the time involved in typing the listings yourself. Successful loading of the programs depends on reading the documentation in the articles. If you have your current magazine at hand when you load the cassette or boot up the disk, you should have no difficulty. If you still have problems, please return the tape or disk for replacement.

LOAD 80 began with the April 1981 issue. To order back issues, look for the bak issue advertisement in this magazine or ask your local dealer.

To order **LOAD 80**, fill in the attached card and we will send you your **LOAD 80** cassette or disk for the major programs in this issue. If the card is missing, fill in the coupon below (a photocopy is acceptable) and mail it to: **LOAD 80**, 80 Pine Street, Peterborough, NH 03458

Yes, I want August LOAD 80

☐ YES. I want a cassette of the Aug 1982 LOAD-80 for $17.97 each (plus $1.50 for postage and handling).

☐ YES. I'll save 30%. Sign me up for a year of LOAD-80 beginning with the Aug 1982 cassette. $99.97 for 12 issues.*

☐ Visa ☐ Am. Ex ☐ MasterCard

☐ Check/Money order

☐ YES. I want the Aug 1982 LOAD-80 on disk for $29.97 each (plus $1.50 for postage and handling).

☐ YES. I want to save money. I'll subscribe to LOAD-80 on disk beginning with the Aug 1982 issue. $199.97 a year.*

Name: _____

Address: _____

City: _____ **State:** _____ **Zip:** _____

Signature: _____ **Card#** _____ **Exp. Date:** _____

8/82

LOAD 80 is manufactured by Instant Software, a subsidiary of WAYNE GREEN INC. 80 Pine St. Peterborough, NH 03458. There is no warranty expressed or implied that LOAD 80 will do anything other than save you typing.

Foreign air mail, please inquire.

Space fun for the Models I and III, and Color Computer.

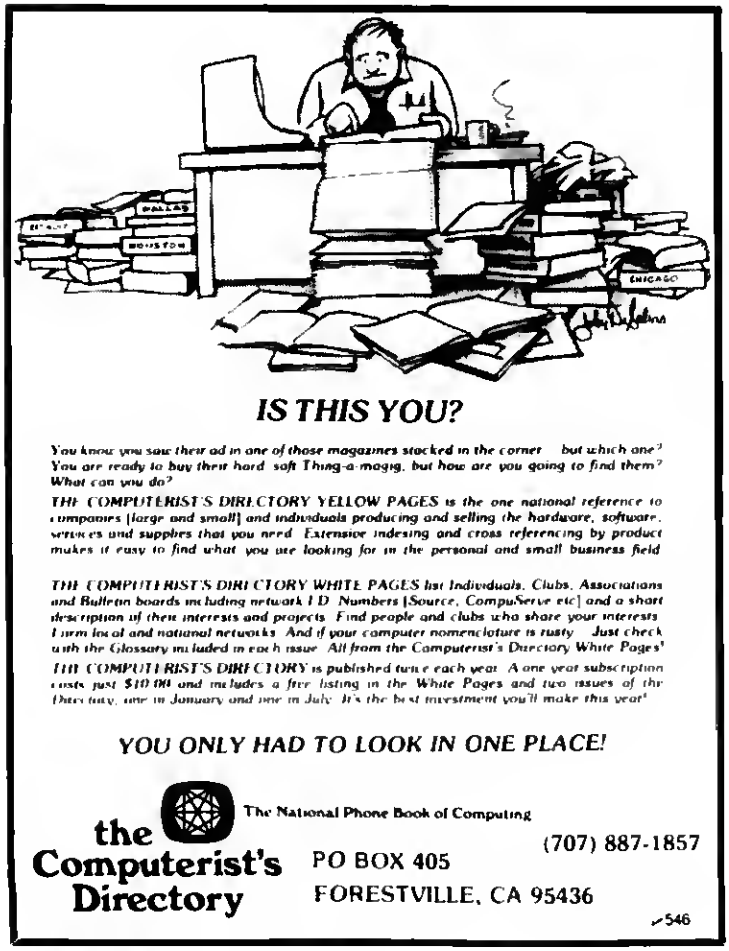
Space Duel

Dave Edick
15938 Gramercy Drive
San Leandro, CA 94578

I wrote Space Duel for my dad's Model I. I recently bought a TRS-80 Color Computer and rewrote Space Duel for it.

Space Duel is a real-time arcade type game with one smart ship which permits a fast pace.

Although I tried to make the Model I and Color versions similar I made some concessions. First was the graphics. The Model I version features smaller ships and barriers but lacks sound. It ran too slow with a machine language sound routine. Rather than sacrifice speed I removed the sound routine. Other than these two differences, the versions are nearly identical. On both versions pressing the left or right arrow keys moves the ship one space. Pressing the @ key fires your laser.



IS THIS YOU?

You know you saw their ad in one of those magazines stocked in the corner... but which one? You are ready to buy their hard/soft Thing-a-magig, but how are you going to find them? What can you do?

THE COMPUTERIST'S DIRECTORY YELLOW PAGES is the one national reference to companies [large and small] and individuals producing and selling the hardware, software, services and supplies that you need. Extensive indexing and cross referencing by product makes it easy to find what you are looking for in the personal and small business field.

THE COMPUTERIST'S DIRECTORY WHITE PAGES list Individuals, Clubs, Associations and Bulletin boards including network I.D. Numbers [Source, CompuServe etc] and a short description of their interests and projects. Find people and clubs who share your interests. Learn local and national networks. And if your computer nomenclature is rusty... Just check with the Glossary included in each issue. All from the Computerist's Directory White Pages!

THE COMPUTERIST'S DIRECTORY is published twice each year. A one year subscription costs just $10.00 and includes a free listing in the White Pages and two issues of the Directory, one in January and one in July. It's the best investment you'll make this year!

YOU ONLY HAD TO LOOK IN ONE PLACE!

the Computerist's Directory

The National Phone Book of Computing

(707) 887-1857

PO BOX 405
FORESTVILLE, CA 95436

✓546

Principles of Operation

As you can see from the flowchart (Fig. 1), Space Duel crams a lot into a small amount of memory space or it would not fit into a 4K Color Computer. Space Duel is mostly subroutines. Some of the variables need explanation.

Variable	Description
A	Timer
A$	Keyboard scan
CC	Player's fire delay
E$	String of blank graphic blocks
HI	Direct hits
I	Computer's fire flag
P	Barrier position
PO	Player's ship position
Q	Hit display timer
S	Number of shots taken
SHIP$	Player's ship
T	Timer
TAR	Computer's ship position
TAR$	Computer's ship
V	Number of ships remaining
X	Missile position horizontal
Y	Missile position vertical

Table 1. Variable Table

First is the INKEY$ function for the kayboard scan. The keyboard can be accessed directly by PEEKing a certain memory location. However, when most people play the game with the repeat key capability, they spend more time running than dueling. Second is the use of the fire delay variable (CC). This eliminates repeat firing. Repeat firing results in a boring Space Duel game. Last is variable I, the computer fire flag. With this the player can move his ship while the computer's missile is moving down the screen by returning to the main loop only long enough for the player to move away, then returning to the fire routine.

Program Listing 1 is for Model I and Program Listing 2 is the Color Computer version. The flowchart and variable table (Table 1) apply for both versions. Both use the same line numbers. The Model I version will work on a Model III without change. The Color Computer version, written for a 4K machine, uses rather crude graphic routines and low resolution graphics. In other words, both versions can be improved. ■

The Key Box

Level II
Modal I, III and Color
4K RAM

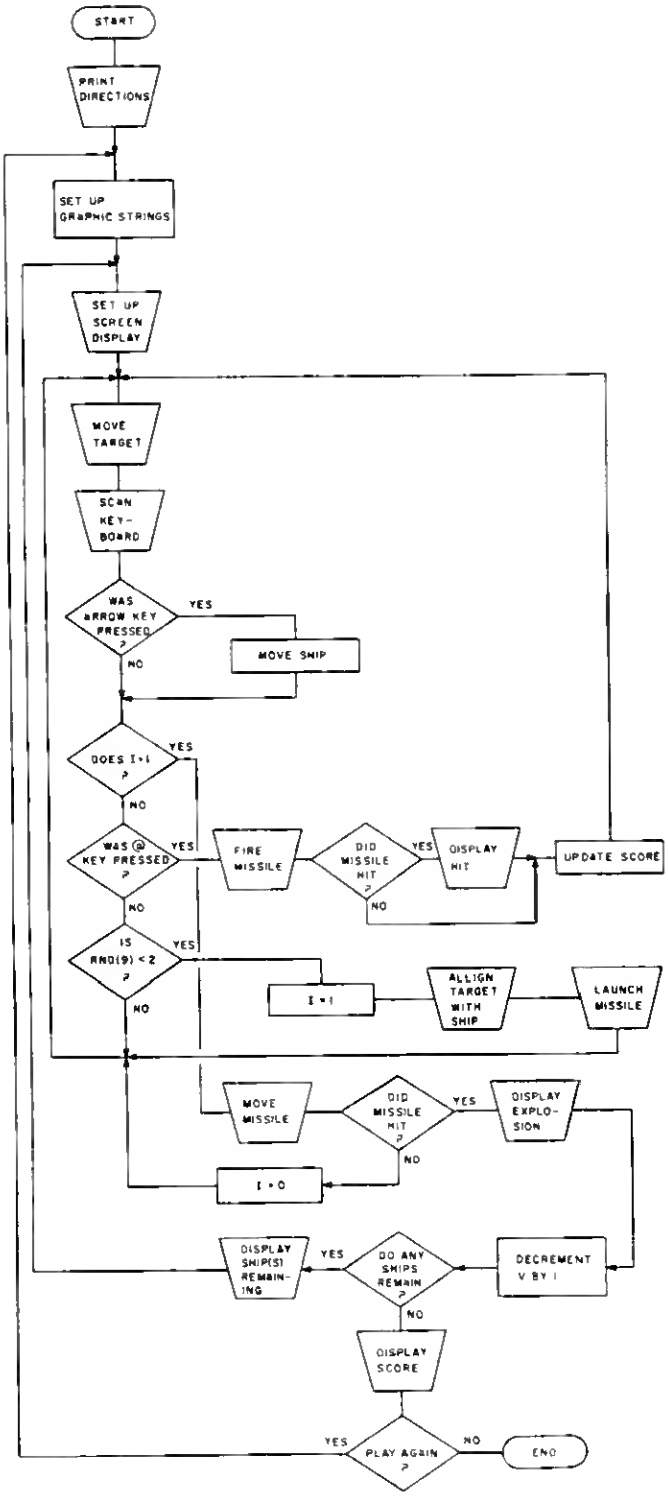


Fig. 1. Flowchart

Program Listing 1. Model I Version

```
0 CLS:DEFINT A-Z:PRINTTAB(25);"*** SPACE DUEL ***"
1 PRINT:PRINT"THE OBJECT OF THIS GAME IS TO HIT THE SPACE FIGHTE
R AT THE TOP  OF THE SCREEN AS MANY TIMES AS POSSIBLE BEFORE IT
HITS YOO 3 TIMES."
2 PRINT"TO STEER YOUR SHIP USE THE LEFT AND RIGHT ARROW KEYS.
3 PRINT"TO FIRE USE THE @ KEY"
4 PRINT:PRINT"PRESS ENTER TO BEGIN"
5 IF INKEY$="" THEN 5
```

Program continues

EDU-WARE EAST
P.O. Box 336
Maynard, MA. 01754
617-568-8641

MATH-PAK-1: MATH-PAK-2: MATH-PAK-3

Interactive drill programs where you enter the answers digit by digit, just like paper and pencil. With user selected difficulty levels, carryovers, reducing, simplification, pointing off, scoring, games, and more. Used by schools everywhere. Order MATH-PAK-1 for Integers, MATH-PAK-2 for fractions, MATH-PAK-3 for decimals. (L2-16K) $14.95 ea.

H-O-R-K-S

Low cost, single entry accounting system for the home or office. With 88 user assigned account codes, auto audit trail, search with totals, 32 or 48K, 1 to 4 drives, credit and debit summarise with 3 options, up to 9200 entries. $24.95/cassette $29.95/disc

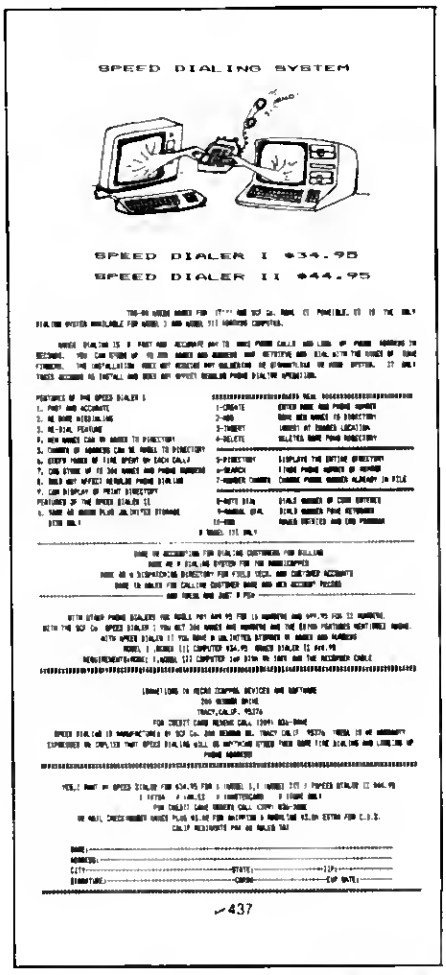
INVENTORY +

Why settle for just an inventory listing? Get aging reports with 2 options, reorder, total listings with purchase dates and amounts, total costs, items sold, profit/loss and more. Use as a stand alone system with daily updates, delete, change, and file packing routines. (32K - 1 disc minimum) $24.95/cassette $29.95/disc.

CASH REGISTER 80

Use your TRS-80 as a point of sale terminal with automatic inventory lookup, pricing, update, and more. Print sales slips with user adjusted formats, end of day reports with all cash, charge, and check sales by salesperson. CR80 requires INVENTORY+, 48K, and 1 disc minimum (2 drives recommended).
$24.95/cassette $29.95/disc.

Mass residents and 5% tax. VISA, M.C., AND PHONE ORDERS ACCEPTED. Dealer inquiries invited. Overseas orders add $2.00 for air shipment. TRS-80 is a trademark of Tandy Corp.



✓See List of Advertisers on page 338

New UTILITIES

For Basic programming

EDIT+ Now you can edit your Basic programs quickly and easily with this Full-screen Editor. Full 4-way cursor movement allows you to make changes to multiple program lines at one time. Global locate will help you find lines containing a specific string of characters. Also, the Disk version features a line re-numbering command to renumber your program; renumbers all line references within the program plus all line numbers.

Tape Version 1.2	19.95
Disk Version 2.0 (on 5.25" floppy disk)	19.95
Disk Version 2.0 (on cassette tape)	19.95

SORT+ Now get machine language speed to sort dimensioned variables in your Basic programs. Load Quicksort into your computer, then load your Basic program. Adds a new command to Basic called SORT, making it easy to use. This program is compatible with our Editor program above, although you do not need the Editor to use Quicksort.

Tape Version 1.0 (Tape systems only)	6.95
Instruction Manuals only — Refundable	1.00 ea

NJ residents add 5% Sales Tax

dcs SOFTWARE

86 Mansel Drive, Landing, N.J., 07850

Tel. 201 398-8281

↙517

MAXPRINT

PRINTER DRIVER UTILITY

FOR THE STANDARD EPSON MX-80 PRINTER

* SUPPORTS ALL MX-80 PRINT STYLES
* WORDPROCESSING TEXT CONTROL MODE
* MENU MODE FOR GENERAL APPLICATION
* TRUE PROPORTIONAL JUSTIFICATION

* UNDERLINES ANYWHERE
* CENTERS TITLES
* SUBSCRIPTS
* SUPERSCRIPTS
* DYNAMIC CONTROL OF LINE SPACING IN 1/72 IN. INCREMENTS
* DYNAMIC CONTROL OF MARGINS
* WORKS WITH MOST PROGRAMS INCLUDING SCRIPSIT™

Maxprint is an extraordinary user oriented printer driver utility program which allows you to select any MX-80 print style or function such as underlining on a character by character basis within word processing text. Maxprint also features proportional right margin justification within a block of standard text to give your printout a truly professional appearance.

Maxprint consists entirely of Z-80 machine language for fastest possible printing performance. Minimum system requirements are a 32K Model I or Model III with one disk drive.

Unleash the true potential of your MX-80. Maxprint is supplied on disk with an extensive 40 page manual and shipping for only:

* * *27.95 * *

TO ORDER: Call (408) 737-2253 Visa / Mastercard
Send check or money order to:
Peggytronics,
301 First Street, Suite 5147
Los Altos, California 94022

↙333

CA residents add 6% sales tax // Scripsit TM of Tandy Corp.

Program continued

```
6 'SET UP GRAPHIC STRINGS
7 CLEAR 320:E$=STRING$(64,128):V=3:SHIP$=CHR$(142)+CHR$(141):TAR
$=CHR$(136)+CHR$(134)
9 'SET UP SCREEN DISPLAY
10 CLS:GOSUB 5000:PO=835+RND(55)
50 'SET UP BARIERS
60 FOR P=264 TO 310 STEP 11
63 PRINT@P,STRING$(4,143);:PRINT@P+512,STRING$(4,143);
66 NEXT
75 'ERASE AND REPOSITION TARGET
76 PRINT@192,E$;:IF I=0 THEN TAR=(PO-640)+(3-RND(6))
80 PRINT@TAR,TAR$;:GOTO 92
90 GOTO 76
91 'MAIN CONTROL LOOP
92 A$=INKEY$:CC=CC+1:PRINT@832,E$;
100 IF A$=CHR$(8) THEN PO=PO-1
110 IF A$=CHR$(9) THEN PO=PO+1
112 PRINT@PO,SHIP$;
115 IF I=1 THEN 1065
120 IF A$="@" AND CC<2 THEN 1000
125 IF RND(9)<2 THEN 10000 ELSE 76
999 'PLAYER'S FIRE ROUTINE
1000 X=(PO-832)*2+2:CC=0:FOR Y=38 TO 12 STEP-2:RESET(X,Y+2)
1030 IF POINT(X,37) THEN 90 ELSE SET(X,Y):NEXT
1040 IF POINT(X,10) THEN 2000
1065 S=S+1:GOSUB5000:I=0:RESET(X,Y+2):GOTO 76
1999 'HIT COMPUTER'S SHIP ROUTINE
2000 RESET(X,Y+2):FORQ=1TO25:PRINT@TAR,CHR$(166)+CHR$(166);:PRIN
T@TAR,CHR$(153)+CHR$(153);:NEXT:S=S+1:HI=HI+1:GOSUB 5000:GOTO80
4999 'PRINT SCORE
5000 PRINT@0,"SHOTS="S,,"HITS="HI:RETURN
9999 'COMPUTER'S FIRE ROUTINE
10000 TAR=PO-640:X=(TAR-192)*2+1:I=1:IFPOINT(X,12)THENI=0:GOTO76

10020 FORY=12 TO 38 STEP 4:SET(X,Y):IFRND(9)<4THEN76
10050 RESET(X,Y):NEXT:I=0
10060 IF POINT(X,40) THEN 20000 ELSE RESET(X,Y-4):GOTO 76
19999 'HIT PLAYER'S SHIP ROUTINE
20000 CLS:FOR A=1 TO 30:PRINTSTRING$(64,191);:NEXT:I=0:V=V-1
20017 IF V=0 THEN 50000
20020 CLS:PRINT@530,"YOU HAVE BEEN HIT.":PRINT TAB(11);"YOU HAVE
 "V" SHIPS REMAINING."
20030 FOR T=1 TO 500:NEXT:GOTO 10
50000 CLS:PRINT@540,"GAME OVER":PRINTTAB(15);"TOTAL SHOTS="S,"TO
TAL HITS="HI:PRINT:PRINT"DO YOU WANT TO PLAY AGAIN?":T$=INKEY$
50010 A$=INKEY$:IF A$="" THEN 50010 ELSE IF A$="Y" THEN RUN 7
```

```
0 CLS
1 PRINTTAB(10),"SPACE DUEL"
2 PRINT:PRINT"THE OBJECT OF THIS GAME IS TO "
3 PRINT"HIT THE SPACE FIGHTER AT THE TOPOF THE SCREEN AS MANY TI
MES AS  POSSIBLE BEFORE IT HITS YOU 3   TIMES."
4 PRINT"TO STEER YOUR SHIP USE THE LEFT AND RIGHT ARROW KEYS.":P
RINT"TO FIRE USE THE @ KEY.":PRINT:PRINT"PRESS ENTER TO BEGIN."
5 IF INKEY$="" THEN 5
6 REM SET UP GRAPHIC STRINGS
7 FORA=1TO30:E$=E$+CHR$(128):NEXT:V=3:SHIP$=CHR$(183)+CHR$(187):
TAR$=CHR$(249)+CHR$(248)
9 REM SET UP SCREEN DISPLAY
10 CLS0:GOSUB5000:POS=450+RND(23)
50 REM SET UP BARIERS
60 DATA 131,141,151,387,397,407
70 FOR T=1 TO 6:READ X
72 FOR A=1 TO 3:PRINT@X+A,CHR$(207);:NEXT A,T
75 REM ERASE AND REPOSITION TARGET
76 PRINT@64,E$;:IF I=0 THEN TAR=(POS-384)+(3-RND(6))
80 PRINT@TAR,TAR$;:GOTO 92
90 GOTO 76
91 REM MAIN CONTROL LOOP
92 A$=INKEY$;CC=CC+1:PRINT@448,E$;
100 IF A$+CHR$(8) THEN POS=POS-1
110 IF A$=CHR$(9) THEN POS=POS+1
112 PRINT@POS,SHIP$;
115 IF I=1 THEN 1065
120 IF A$="@" AND CC>2 THEN 1000
125 IF RND(9)<2 THEN 10000 ELSE 76
999 REM PLAYER'S FIRE ROUTINE
1000 TAR=POS-384:X=(TAR-64)*2+1:CC=0:FOR Y=25 TO 5 STEP -4:SOUND
 Y*2,1:RESET(X,Y+4)
1030 IF POINT(X,Y)=0 THEN 2000
1040 IF POINT(X,Y-1)=0 THEN SET(X,Y,3):NEXT
1065 S=S+1:GOSUB 5000:I=0:RESET(X,Y+4):GOTO 90
1999 REM HIT COMPUTER'S SHIP ROUTINE
2000 RESET(X,Y):PRINT@TAR,CHR$(173);CHR$(173);:FOR T=60 TO 150 S
TEP 10:SOUND T,1:NEXT:S=S+1:HI=HI+1:GOSUB 5000:GOTO 80
4999 REM PRINT SCORE ROUTINE
5000 PRINT@0,"SHOTS="S,"HITS="HI:RETURN
9999 REM COMPUTER'S FIRE ROUTINE
10000 TAR=POS-384:X=(TAR-64)*2+1:I=1:IFPOINT(X,9)THENI=0:GOTO90
10020 FORY=5TO24STEP4:SOUND(30-Y)*4,1:SET(X,Y,1)
10040 IF RND(9)>3 THEN 90
10050 RESET(X,Y):NEXT:I=0
10060 IF POINT(X,29)=4 THEN 20000 ELSE RESET(X,Y-4):GOTO90
19999 REM HIT PLAYER'S SHIP ROUTINE
20000 FORA=1TO0:CLSA:SOUND(10-A)*10,1:NEXT:I=0:V=V-1
20017 IF V=0 THEN 50000
20020 CLS:PRINT@256,"YOU HAVE BEEN HIT.":PRINT"YOU HAVE "V" SHIP
S REMAINING."
20030 RESTORE:FORT=1TO500:NEXT:GOTO10
50000 CLS:PRINT@235,"GAME OVER":PRINT"TOTAL SHOTS="S,"TOTAL HITS
="HI:FORT=1TO500:NEXT:PRINT:PRINT"DO YOU WANT TO PLAY AGAIN?"
50010 T$=INKEY$
50030 A$=INKEY$:IFA$=""THEN50030ELSEIFA$="Y"THENRUN7
```

Program Listing 2. Color Computer Version

TUNE-UP YOUR TRS-80®

Ever wanted to do things to your TRS-80 that Radio Shack said couldn't be done?

How about upper/lower case, reverse video, high-resolution graphics, a high-speed clock, audible keystrokes, an extra keyboard, and a real-time clock?

Still not enough?

How about using an 8-track as a mass storage device, making music, controlling a synthesiser, monitoring your data bus, and individual reverse characters? All these hardware modifications, plus lots more, are in *The Custom TRS-80 and Other Mysteries* by *Dennis Bathory Kitz* - the latest book from *IJG Computer Services.*

If the thought of using a screwdriver gives you the shivers then you can turn to the software section. In this you learn how to make 8ASIC programs auto-execute, reset the memory size, patch into the interpreter, test memory with machine-language, pack program lines with machine code, and generate sound effects.

The Custom TRS-80 and Other Mysteries is more than 300 pages of practical information, and tested software, for $29.95. Order your copy now, and start turning your TRS-80 into a five-hundred-dollar supercomputer! Pick one up at your local *IJG* dealer and B. Dalton bookstores

IJG
1260 West Foothill Bl.
Upland, CA
91786 (714)
946-5805

ON SALE NOW!

TRS-80 is a Trade Mark of the Tandy Corporation

A Merlin adaptation for the CC.

Square Game

Chuck Kanach
PSC #1 Box 28749
APO S.F. 96230

The object of Squere Game (adepted from Merlin) is to light up all of the dots in the outside cubes keeping the center cube dot off. Each cube is numbered. Selecting the corresponding key not only turns that cube's dot on or off, but it also effects surrounding cubes.

Square Game will run on the TRS-80 4K Color Computer if the remark statements ere deleted. I added the remarks after upgrading my system to 16K. I sent Dave McGlumphy (see "Simon," *80 Micro*, August 1981) a listing of Squere Game and he got it to work on his Model I, Level II system by leaving out the color and sound statements.

Program Listing

```
10 REM *****SQUARE GAME*****
20 REM ** ADAPTED FROM MERLIN**
30 REM BY CBUCK KANACB
40 REM PSC#1 BOX28749
50 REM APO SF 96230
60 REM WRITTEN ON TRS-80 COLOR          COMPUTER 4K SYSTEM
70 '
80 CLS0
90 0=0:REM COLOR OF GRID LINES
100 C=2:REN COLOR OF DOTS
110 '
120 REM  NUM0ER EACH SQUARE
130 '
140 PRINT@170,"1";:PRINT@178,"2";:PRINT@186,"3";
150 PRINT@298,"4";:PRINT@306,"5";:PRINT@314,"6";
160 PRINT@426,"7";:PRINT@434,"8";:PRINT@442,"9";
170 PRINT@42," ENTER (1-9) ";
180 '
190 '
200 REM DRAW HORIZONTAL LINES
210 '
220 FOR X=0TO56
230 FOR Y=5TO29STEP8
240 SET(X,Y,0)
250 NEXTY
260 NEXTX
270 '
280 '
290 REM DRAW VERTICAL LINES
300 '
310 FOR X=0TO56STEP16
320 FOR Y=6TO28
330 SET(X,Y,B)
340 NEXTY
```

Program continues

Color

The CLS0 statement in line 80 establishes e bleck background. Lines 90 and 100 select the color for the grid lines and dots, respectively. You can change the color variables using the color codes in your owner's manual.

Color Computer SET statements, lines 240 and 330, require a third variable to determine the color. SET (32,16,8) would produce an orange dot in the center of the screen.

Reset statements do not require a color variable. RESET

The Key Box

Color Basic
or Level II
Color Computer
or Model I
4K RAM

WE WILL NOT BE UNDERSOLD

SOFTWARE

MICROPRO		
Wordstar		$319
Mailmerge		$109
Wordstar/Mailmerge		$419
Customization Notes		$399
MICROSOFT		
Basic Interpreter		$349
Basic Compiler		$389
Fortran 80		$499
Cobol 80		$695
DATA BASE		
FMS80		$595
dBase II		$599
MISCELLANEOUS		
Computer Station Graphics Dump		$39 95
SuperCalc"		$269
Personal Filing System		$75
PFS Report Writer		$75
INFORMATION UNLIMITED for the IBM Personal Computer		
Easywriter II	**NEW!**	**$299**
Easyspeller II	**NEW!**	**$149**
Easyfiler	**NEW!**	**$329**

APPLE SOFTWARE

MICROPRO		
Wordstar		$269
MailMerge		$99
Wordstar/Mailmerge		$349
Spellstar		$149
VISICORP		
VisiCalc™		$199
VisiTerm™		$79
VisiDex™		$199
VisiPlot™		$169
VisiFile™		$199
VisiSchedule™		$259
VisiTrend/Plot™		$239
VisiPac™		$539
MISCELLANEOUS		
Micro Courier		$219
Screenwriter II		$129
ENTERTAINMENT		
Wizard and Princess		$29
Raster Blaster		$26
Space Eggs		$26
Twerps		$28
Borg		$28
Castle Wolfenstein		$27
Beer Run		$28
Epoch		$32
Sneakers		$27
Midnight Magic		$32
Wizardry		$45
Time Zone		$79
Ghost Hunter		$29
Jawbreaker		$20

TERMINALS

ADDS Viewpoint	$569
Zenith Z-19	$689
Televideo 910	$595
Televideo 920	$769
Televideo 92S	$779
Televideo 950	$969

For fast delivery, send certified checks, money orders, or call to arrange direct bank wire tranfers. Personal or company checks require one to three weeks to clear. All prices are **mail order only** and are subject to change without notice. **Call for shipping charges.**

APPLE ACCESSORIES

Z-80 Card by Microsoft		$319
16K Card by Microsoft		$159
32K Card by Saturn		$199
Keyboard Enhancer II by Videx		$125
Videoterm by Videx		$259
Game Paddles by TG		$49
Joystick by TG		$49
Numeric Keypad by Keyboard Co		$139
Sup-R-Mod		$25
Sup-R-Fan		$39
ALF 9 Voice Board		$159
Station II by Trace Systems		$119
APPLE INTERFACE CARDS BY CCS		
Parallel #7720		$119
Centronics #7728		$115
Serial Asynch. #7710		$139
Serial Synch #7712		$149
ADVANCED LOGIC	**NEW!**	
Add-Ram 16K Card	**NEW!**	**$119**
Z-Card CP/M for the Apple II	**NEW!**	**$225**
Smarterm 80 Column Board with Softswitch	**NEW!**	**$249**
The Synergizer All of the above plus "The CP/M Handbook"	**NEW!**	**$599**

DISK DRIVES

CCI 100 for the TRS-80 Model 1 5¼ 40 track		$299
CCI 189 for the Zenith Z-89 5¼ 40 track		$379
Corvus 5M with Mirror		$3089
Corvus 10M with Mirror		$4489
Corvus 20M with Mirror		$5429
Corvus Interfaces		CALL
RANA SYSTEMS add-on Disc Drive for the Apple II	**NEW!**	
Elite One 40 Track	**NEW!**	**$419**
Elite Controller	**NEW!**	**$119**

DISKETTES

Maxell 5¼ single side		$39
Maxell 8 single side		$49
Maxell 5¼ double side		$45
Maxell 8 double side		$55
BASF 5¼		$26.95
BASF 8		$36
Verbatim 5¼		$26 95
Verbatim 8		$36
Wabash 5¼	**NEW!**	**$34.95**
Wabash 8	**NEW!**	**$39.95**

TELECOMMUNICATIONS

Prentice Star Modem	$129
Novation Cat Modem	$139
Novation D-Cat	$149
Novation Auto-Cat	$199
Novation Apple-Cat	$299
Hayes Smart Modem	$249
Hayes Micro-Modem	$295
Hayes Chronograph	$225

Dealer (National/International) Inquiries Invited. Send for FREE catalogue

COMPUTERS

ATARI (Call for prices on the complete Atari line)		
Atari 800		$699
Atari 400		$369
CALIFORNIA COMPUTER SYSTEMS		
Mainframe 220		$485
64K Ram 2065		$569
Z-80 CPU 2810A		$265
Floppy Controller 2422a		$359
ZENITH (Call for prices on the complete Zenith line)		
Zenith Z-89 48K		CALL
Zenith Z-90 64K		CALL
COMMODORE VIC-20	**NEW!**	**$239**
CASIO FX702 Pocket Computer	**NEW!**	**$189**

SPECIAL OF THE MONTH
SANYO MBC 1000
64K COMPUTER $1595

PRINTERS

NEC 7710 Serial		$2395
NEC 7720 KSR		$2749
NEC 7730 Parallel		$2395
NEC 3510 Serial		$1850
NEC 3530 Parallel		$1850
NEC 8023 Dot Matrix 100cps		$559
Olivetti DY211 Letter Quality Daisy Wheel Printer		$1595
Parallel Only		$1395
Epson MX-80		CALL
Epson MX-80FT		CALL
Epson MX-100		CALL
IDS 560		CALL
IDS Prism 80		CALL
IDS Prism 132		CALL
Okidata Microline 80		CALL
Okidata Microline 82A		CALL
Okidata Microline 83A		CALL
Okidata Microline 84		CALL
Centronics 739		$699
Datasouth 180 cps		CALL

MONITORS

Amdek 12" B&W		$109
Amdek 13" Color		$329
Sanyo 9" B&W		$135
Sanyo 9" Green		$140
Sanyo 12" B&W		$179
Sanyo 12" Green		$189
Sanyo 13" Color		$359
Zenith 12" Green		$119
Zenith 13" Color		$339
ELECTROHOME 13" HI-RES COLOR MONITOR	**NEW!**	**$829**
ELECTROHOME 13" COLOR	**NEW!**	**$349**
ELECTROHOME 12" B&W	**NEW!**	**$179**
ELECTROHOME 12" GREEN	**NEW!**	**$189**
ELECTROHOME 9" B&W	**NEW!**	**$149**
ELECTROHOME 9" GREEN	**NEW!**	**$159**

RAM

16K Ram Kit for Apple II, TRS80 200 nano seconds, 4116 chips	$19
Two Kits	$35
Jumpers	$2 50

The CPU Shop

TO ORDER CALL TOLL FREE 1-800-343-6522

420-438 Rutherford Ave., Dept. M08M, Charlestown Massachusetts 02129 ↙ 100

Hours: 9 AM – 9 PM (EST) Mon.-Fri. (Sat. till 7) TWX- 710-348-1796 Massachusetts Residents call 617/242-3361

Technical information call 617/242-3361 Massachusetts Residents add 5% Sales Tax

↙ See List of Advertisers on page 338

(32,16) will remove the orange dot. The point function can be used to check and change the dots' set color.

```
IF POINT(X,Y)=3 THEN
```

This checks for a blue dot at position (X,Y). I instructed the Point function to check for an off or on condition.

```
IF POINT(X,Y)=0 THEN
```

Any number, other than zero, would indicate the point is on. Checking for a zero allowed me to experiment with different grid line and dot color combinations without having to change the Point functions throughout the program every time I changed a color variable.

Lines and Dots

Lines 200-350 draw the horizontal and vertical grid lines using a pair of For...Next and a single SET statement. The dots were a bit more involved. I wanted each game to begin differently. The RND function in line 420 made this possible. It's like flipping a coin; if R equals one the dot stays off (reset) and if R equals two the dot is turned on (set). The For...Next statements, lines 400 and 410, ensure that all nine dots are set or reset.

INKEY$

Entering a number from one to nine and pressing the Enter key each time becomes a chore, so INKEY$ to the rescue. Every time the desired number key is pressed certain dots are set or reset immediately (lines 660-990). All nine dots are checked after each move by lines 1000-1080 to determine if you have won.

Sound

Each time a proper key is pressed line 500 produces a tone. When you figure out the proper sequence the computer declares you a winner and lines 1110-1180 produce a celebration array of sounds and colors. Then it's back to business; the screen is cleared, the grid lines redrawn, the dots repositioned and you are ready to play again.■

Program continued

```
350 NEXTX
360 '
370 '
380 REM RANDOMLY SELECTS THE             DOTS
390 '
400 FOR PX=16TO48STEP16
410 FOR PY=9TO25STEP8
420 R=RND(2)
430 IF R=1THEN460
440 SET(PX,PY,C)
450 GOTO470
460 RESET(PX,PY)
470 NEXTPY:NEXTPX
480 '
490 '
500 SOUND125,1:RENSOUND
510 '
520 REM PLAYER SELECTS #1-9.
530 REM DEPENDING ON NUMBER, THE         DOTS WILL SET OR RESET.
540 '
550 A$=INKEY$
560 IFA$="1"THEN660
570 IFA$="2"THEN700
580 IFA$="3"THEN730
590 IFA$="4"THEN770
600 IFA$="5"THEN800
610 IFA$="6"THEN860
620 IFA$="7"THEN890
630 IFA$="8"THEN930
640 IFA$="9"THEN960
650 GOTO 1000
660 FOR X=16TO32STEP16
670 IFPOINT(X,9)=0THENSET(X,9,C)ELSERESET(X,9)
680 IFPOINT(X,17)=0THENSET(X,17,C)ELSERESET(X,17)
690 NEXTX:GOTO500
700 FOR X=16TO48STEP16
710 IFPOINT(X,9)=0THENSET(X,9,C)ELSERESET(X,9)
720 NEXTX:GOTO500
730 FOR X=32TO48STEP16
740 IFPOINT(X,9)=0THENSET(X,9,C)ELSERESET(X,9)
750 IFPOINT(X,17)=0THENSET(X,17,C)ELSERESET(X,17)
760 NEXTX:GOTO500
770 FOR Y=9TO25STEP8
780 IFPOINT(16,Y)=0THENSET(16,Y,C)ELSERESET(16,Y)
790 NEXTY:GOTO500
800 FOR X=16TO48STEP16
810 IFPOINT(X,17)=0THENSET(X,17,C)ELSERESET(X,17)
820 NEXTX
830 FOR Y=9TO25STEP16
840 IFPOINT(32,Y)=0THENSET(32,Y,C)ELSERESET(32,Y)
850 NEXTY:GOTO500
860 FOR Y=9TO25STEP8
870 IFPOINT(48,Y)=0THENSET(48,Y,C)ELSERESET(48,Y)
880 NEXTY:GOTO500
890 FOR X=16TO32STEP16
900 IFPOINT(X,17)=0THENSET(X,17,C)ELSERESET(X,17)
910 IFPOINT(X,25)=0THENSET(X,25,C)ELSERESET(X,25)
920 NEXTX:GOTO500
930 FOR X=16TO48STEP16
940 IFPOINT(X,25)=0THENSET(X,25,C)ELSERESET(X,25)
950 NEXT:GOTO500
960 FOR X=32TO48STEP16
970 IFPOINT(X,17)=0THENSET(X,17,C)ELSERESET(X,17)
980 IFPOINT(X,25)=0THENSET(X,25,C)ELSERESET(X,25)
990 NEXTX:GOTO500
1000 IFPOINT(32,17)=0THEN1010ELSE550
1010 IFPOINT(16,9)<>0THEN1020ELSE550
1020 IFPOINT(32,9)<>0THEN1030ELSE550
1030 IFPOINT(48,9)<>0THEN1040ELSE550
1040 IFPOINT(16,17)<>0THEN1050ELSE550
1050 IFPOINT(16,25)<>0THEN1060ELSE550
1060 IFPOINT(48,17)<>0THEN1070ELSE550
1070 IFPOINT(32,25)<>0THEN1080ELSE550
1080 IFPOINT(48,25)<>0THEN1130ELSE550
1090 '
1100 '
1110 REM DECLARES THAT YOU ARE A         WINNER!!
1120 '
1130 FOR C=0TO8STEP-1
1140 FOR S=150TO200STEP10
1150 SOUNDS,1
1160 CLS(C)
1170 PRINT@198,">>>** WINNER!! **<<<";
1180 NEXTS,C
1190 CLS8
1200 GOTO80:REM STARTS THE GAME      OVER AGAIN.
```

POCKET COMPUTER NEWSLETTER

A NEWSLETTER FOR POCKET COMPUTER USERS

This timely, compact publication provides up to the minute information on pocket computers, including models such as the Radio Shack TRS-80 PC-1 and PC-2, Sharp Electronic's PC-1500 and PC-1211, Casio, Panasonic/Quasar HHCs, and others as they are announced. We only cover PCs capable of executing a high level language such as BASIC.

☐ Up to the Minute News ☐ Product & Equipment Reviews ☐ Important Operating Tips ☐ Practical Programs ☐ More

By Subscription Only: for a calendar year period (January – December). You get all issues published to date for the calendar year in which you subscribe, at the time you subscribe.

MC/VISA Phone Subscriptions: (203) 888-1946

☐ 1981/82 Charter Subscriber (Issues 1 – 20). $40.00 in U.S. (U.S. $48.00 to Canada. U.S. $60.00 elsewhere.)

☐ 1982 Regular Subscriber (Issues 11 – 20). $30.00 in U.S. (U.S. $36.00 to Canada. U.S. $45.00 elsewhere.)

☐ Sample issue. $3.00 in U.S. (U.S. $4.00 elsewhere.) *Due to credit card minimum, this item cannot be charged.

Orders must be accompanied by payment in full. We do not issue invoices for the POCKET COMPUTER NEWSLETTER. Thank you for your remittance.

Name: _____

Addr: _____

City: _____ State: ___ Zip: _____

MC/VISA #: _____ Expires: _____

Signature: _____

POCKET COMPUTER NEWSLETTER
35 Old State Road, Oxford, CT 06483

✓ 25

COLOR COMPUTER SOFTWARE

BASIC AID

HELP FOR THE BASIC PROGRAMMER

At last, the development tools you need! All available instantly at power-up. Look and see what Basic Aid can do.

MERGE COMMAND: Insert programs stored on cassette into your Basic program. You can even assign new line numbers to the file you read in. Create your own tape library!

MOVE COMMAND: Lets you renumber any part of your Basic program. GOTO's, GOSUB's, etc. automatically changed.

AUTOMATIC LINE NUMBERING: You'll love this. Never type in another line number.

PLUS 45 common Basic commands available as single key Control characters. Comes with convenient, easy to remove, plastic keyboard overlay. All of this in a convenient ROM cartridge that uses almost none of your valuable memory ..... CARTRIDGE $34.95

COLORCOM/E SMART TERMINAL PROGRAM

We didn't wait for the competition to catch up with us! We've added even more features to COLORCOM/E, our superb Smart Terminal program.

- Complete upload & download support
- On line cassette reads & writes
- Automatic capture of files
- Pre-enter data before calling
- Send all 127 ASCII characters
- Word mode eliminates split words
- Off line AND on line scrolling
- Selectable RS232 parameters

We've got the best cassette and upload/download support available. And you can conveniently print any portion of the received buffer you want ..... CARTRIDGE $49.95

EDITOR ASSEMBLER DEBUGGER $69.95

CCEAD: This 8K Basic Program supports cassette files, has full cursor control, line insertion/deletion, and much more. Two pass assembler supports full 6809 instruction set & addressing modes; lists to screen or printer. Debugger allows memory examine /modify, program execution. If not delighted return within 2 weeks for a full refund. You get fully commented Basic source & complete instructions. Requires Ext. Basic & 16K ..... CASSETTE $6.95

STRIPPER: The Stripper takes off all that excess fat in your Basic Programs. Three valuable commands. (1) Delete Remarks. (2) Pack Lines. (3) Delete Spaces. Fully automatic, is not fooled by GOTO's, GOSUB's, etc. Your programs will run faster and take up much less memory ..... CASSETTE $7.95

CUSTOM CARTRIDGES: Put YOUR Basic program into a convenient ROM Cartridge. It's easy! Runs instantly at power-up. Frees up memory. Use for Ad displays, schools, etc. Call or write for info ..... FROM $41.65

Send check, money order, or Visa/MC Number. Include $1 for postage and handling. Visa/MC Phone for fast service

Eigen Systems

P.O. Box 10234
Austin, Texas 78766
(512) 837-4665

✓ 154

PRODUCTS FOR YOUR RADIO SHACK

COLOR COMPUTER

NEW!

MACRO-80C

The Micro Works is pleased to announce the release of its **disk-based editor, macro assembler and monitor**, written for Color Computer by Andy Phelps. THIS IS IT — The ultimate programming tool!

The powerful 2-pass macro assembler features conditional assembly, local labels, include files and cross referenced symbol tables. MACRO-80C supports the complete Motorola 6809 instruction set in standard source format. There are no changes, constraints or shortcuts in the source language definition. Incorporating all of the features of our Rompack-based assembler (SDS80C), MACRO-80C contains many more useful instructions and pseudo-ops which aid the programmer and add power and flexibility.

The screen-oriented text editor is designed for efficient and easy editing of assembly language programs. The "Help Key" feature makes it simple and fun to learn to use the editor. As the editor requires no line numbers, you can use the arrow keys to position the cursor anywhere in the file. MACRO-80C allows global changes and moving/copying blocks of text. You can edit lines of assembly source which are longer than 32 characters.

OCBUG is a machine language monitor which allows examining and altering of memory, setting break points, etc.

The editor, assembler and monitor — as well as sample programs — come on one Radio Shack compatible disk. Extensive documentation included. MACRO-80C **Price: $99.95**

SDS80C — Our famous editor, assembler and monitor in Rompack. Complete manual included. **Price: $89.95**

PARALLEL PRINTER INTERFACE — Serial to parallel converter allows use of all standard parallel printers. You supply printer cable. **PI80C Price: $69.95**

MICROTEXT — Get printouts while using your modem! Also download to cassette. General purpose terminal Rompack. **Price: $59.95**

YOU NEED COLOR FORTH!!

Why? •Forth is faster to program in than Basic
•Forth is easier to learn than Assembly Language
•Forth executes in less time than Basic

Forth is a highly interactive language like Basic, with structure like Pascal and execution speed close to that of Assembly Language. The Micro Works Color Forth is a Rompack containing everything you need to run Forth on your Color Computer.

Color Forth consists of the standard FORTH Interest Group (FIG) implementation of the language plus most of FORTH-79. It has a super screen editor with split screen display. Mass storage is on cassette. Color Forth also contains a decompiler and other aids for learning the inner workings of this fascinating language. It will run on 4K, 16K, and 32K computers. Color Forth contains 10K of ROM, leaving *your* RAM for *your* programs! There are simple words to effectively use the Hi-Res Color Computer graphics, joysticks, and sound. The 112-page manual includes a glossary of the system-specific words, a full standard FIG glossary and complete source listing. COLOR FORTH ... THE BEST! From the leader in Forth, Talbot Microsystems. **Price: $109.95**

GAMES

Star Blaster — Blast your way through an asteroid field in this action-packed Hi-Res graphics game. Available in ROMPACK; requires 16K. **Price: $39.95**

Pac Attack — Try your hand at this challenging game by Computerware, with fantastic graphics, sound and action! Cassette requires 16K. **Price: $24.95**

Berserk — Have fun zapping robots with this Hi-Res game by Mark Data Products. Cassette requires 16K. **Price: $24.95**

Adventure — *Black Sanctum* and *Calixto Island* by Mark Data Products. Each cassette requires 16K. **Price: $19.95** each.

Cave Hunter — Experience vivid colors, bizarre sounds and eerie creatures in hot pursuit as you wind your way through a cave maze in search of gold treasures. This exciting Hi-Res game by Mark Data Products requires 16K for cassette version. **Price: $24.95**

THE MICRO WORKS

Also available: Machine language Monitor ★ 2-pass Disassembler ★ Books ★ Memory Upgrade Kits ★ Parts and Services ★ Call or write for information

California Residents add 6% Tax
Master Charge/Visa and COD Accepted

P.O. BOX 1110 DEL MAR, CA 92014 714-942-2400

✓ 125

✓ See List of Advertisers on page 338

One-on-one hockey simulation.

Color Breakaway

Mitchell Grossbach
5 Bradford Road
Plainview, NY 11803

Color Breakaway recreates that rare occasion in hockey when a lone offensive player goes one-on-one against the opposing goalie. Each player, the goalie and offensive player, has certain advantages and limitations.

The game is set in a rectangular rink, with a goal on the left and a blue line to the right. The shooter can maneuver anywhere in the rink. The goalie can come out of the net or stay back and cover the goal. Pressing the button on the shooter's joystick launches a puck toward the rink's left boundary.

The shooter can control the puck's vertical position up to the blue line. The goalie makes a save by getting in the puck's way. This requires some practice.

The game is played against a running time clock.

Program Parts

The program begins by requesting a game duration input. The shooter is awarded one point for each goal, and the goalie one point for each save. This continues until time runs out. Then, the final score is displayed and you have the option to play again.

Aha! you say. What if the shooter scores a goal and then freezes the puck until time runs out? That would give him an unfair advantage. Yes it would, but we don't let that happen. At the end of the game program line 6005 checks to see that the offensive man has taken at least 10 shots (this can be changed to any number you desire). If he hasn't, the goalie wins.

The program has different sounds for goals scored, saves and missed shots.

In several places a zero is POKEd to address 65495. If your computer contains the 2MHz version of the 6809E microprocessor this will nearly double the game's speed.

The resulting dual-rate clock depends on the address accessed. The Sound command uses a PIA in the high clock address range which probably cannot run at the increased speed. The program restores the original contents of 65495 before calling for sounds.

This speed-up feature will probably make life harder for the goalie. You might want to remove it if he complains too much. ■

Mitchell Grossbach is a ninth grade student at JFK High School in Plainview, NY. His hobbies include rock guitar, baseball and programming.

The Key Box

Color Basic
Color Computer
4K RAM
Joysticks

LP—Duration of game
L—Goalie's score
D—Shooter's score
T—Determines if shot is taken
WR—Number of shots taken
MM—Minutes
SS—Seconds

Table 1. Variable List

Program Listing

```
70 REM' ... COLOR BREAKAWAY...'
80 REM'...  BY MITCHELL GROSSBACH...'
85 REM'... COPYRIGHT(C) 1982...'
90 INPUT"TIME OF GAME(1-10)";LP
95 IF LP>10 OR LP<1 THEN 90
100 POKE 65495,0
110 L=0:D=0:Q=0:T=0:WR=0:MM=0:SS=0:DP=0
120 CLS(0)
130 IF L>1 OR D>1 THEN Q=2
140 PRINT@0,"SAVES:";L:PRINT@23,"GOALS:"D;
145 PRINT@500,"SHOTS:";WR;
150 GOTO 1000
160 REM ... ROUTINE TO MOVE GOALIE
165 H=JOYSTK(0):Y=JOYSTK(1)
170 IF T=1 THEN R=5 ELSE R=40
175 Y=Y/2
180 IF H>11 THEN H=11
185 IF Y>20 THEN Y=20
190 IF Y<13 THEN Y=13
195 IF H<5 THEN H=5
200 SET(H,Y,8):FOR W=1 TO R:NEXT:RESET(H,Y)
210 IF T=1 THEN RETURN
220 GOSUB 230:SS=SS+1:IF SS>59 THEN 2000
225 GOTO 160
230 REM... ROUTINE TO MOVE SHOOTER
235 G=JOYSTK(0):J=JOYSTK(2):K=JOYSTK(3)
240 K=K/2
250 PRINT@43,MM":"SS;
255 IF J>60 THEN J=60
260 IF J<17 THEN J=17
265 IF K>30 THEN K=30
270 IF K<5 THEN K=5
275 GOSUB 400
280 SET(J,K,7):SET(J,K+1,7)
285 FOR P=1 TO 10:NEXT
290 RESET(J,K):RESET(J,K+1)
300 RETURN
400 P=PEEK(65280):IF P=125 OR P=253 THEN GOSUB 500 ELSE 410
410 RETURN
500 REM... FIRE ROUTINE
510 WR=WR+1:REM' SHOT COUNTER'
520 FOR A=J TO 4 STEP -1
530 GOSUB 600
535 IF A<17 THEN 545
540 Q=JOYSTK(0):S=JOYSTK(3)
545 SET(A,S/2,5):FOR P=1 TO 2:NEXT P
550 RESET(A,S/2)
555 T=1:GOSUB 165:NEXT A
560 POKE 65495,126:SOUND 1,5
```

WE CARRY COMPONENTS FOR THE LNW & MDX KITS

7400 SERIES TTL

Type	Price
7404	$ .25
7405	.29
7416	.29
7427	.25
7438	.38
7442	.29
7451	.20
7474	.32
7486	.32
7490	.44
7492	.42
7493	.42
7495	.55
74121	.32
74123	.55
74125	.47
74132	.60
74151	.55
74157	.60
74161	.83
74164	.83
74165	.83
74166	.90
74173	1.05
74175	.65
74176	.75
74194	.73
74195	.64
74366	.64
74367	.66

74LS00 SERIES

Type	Price
74LS00	$ .26
74LS02	.27
74LS04	.31
74LS05	.29
74LS08	.27
74LS09	.32
74LS10	.27
74LS11	.39
74LS13	.43
74LS14	.71
74LS15	.30
74LS20	.26
74LS21	.30
74LS27	.30
74LS30	.26
74LS32	.37
74LS42	.65
74LS74	.39
74LS86	.41
74LS93	.70
74LS123	.92
74LS124	1.35
74LS132	.72
74LS138	.66
74LS139	.66
74LS153	.64
74LS155	.85
74LS157	.67
74LS161	.87
74LS163	.85

74LS00 SERIES

Type	Price
74LS164	.92
74LS166	2.29
74LS174	.71
74LS175	.71
74LS193	.67
74LS240	1.39
74LS241	1.39
74LS244	1.39
74LS245	2.20
74LS257	.76
74LS273	1.75
74LS367	.69
74LS368	.69
74LS373	1.49
74LS374	1.45
74LS393	1.95

74S00 SERIES

Type	Price
74S04	$ .55
74S05	.50
74S22	.47
74S32	.47
74S64	.47
74S74	.58
74S112	.71
74S161	2.95
74S174	1.15
74S175	1.15
74S280	2.15
74S387	2.95

LINEAR

Type	Price
75452	$ .35
LM1488	1.10
LM1489	1.10
uA7805/340T-5	.99
uA7812/340T-12	.99
uA7912/320T-12	.99
79L12	1.25
78H05	5.95
TL084	.99
MC1458	.58
MLM311P1	.90
MC14412	14.95

I.C. SOCKETS

Type	Price
8 PIN S.T.	$ .12
14 PIN S.T.	.14
16 PIN S.T.	.16
18 PIN S.T.	.21
20 PIN S.T.	.23
22 PIN S.T.	.27
24 PIN S.T.	.30
40 PIN S.T.	.47

CRYSTALS

Type	Price
1MHz	$5.95
3.579MHz	2.50
4.0MHz	2.95
16.0MHz	2.95

MEMORY SPECIAL FUNCTION

Type	Price
FD1771B-01	$23.95
FD1793B-01	39.95
BR1941	6.95
TR1602	4.95
Z80A	9.95
Z80B	14.95
MC1372	5.95
MC6674	11.95
2716	6.95
2114	2.95
2102	6.49

We Also Carry
•CAPACITORS•
•RESISTORS•
•CONNECTORS•
•SWITCHES•
ETC.

Write or Call For Complete CATALOG

Texas Digital

(713) 488-4501

17321 El Camino Real ✓450
Houston, Tx. 77058
div. World Wide Data Systems Inc.

VISA, MASTERCARD and AMERICAN EXPRESS
NET 30 TERMS AVAILABLE
D&B Rated Firms, Universities & Government
•Prices do not include shipping•
•Prices are subject to change without notice•


```
570 GOTO 130
600 IF INT(A)=INT(H) THEN 602 ELSE 610
602 IF INT(S/2)=INT(Y) THEN 700
610 IF A<5 AND S/2>13 THEN 615 ELSE 620
615 IF S/2<20 THEN 750
620 RETURN
700 REM... SOUND ROUTINE AFTER SAVE
710 FOR T=1 TO 50 STEP 2
715 POKE 65495,126
720 SOUND T,1:NEXT T
730 L=L+1
735 PRINT@0,"SAVES:"L
740 POKE 65495,0
745 GOTO 130
750 POKE 65495,126:REM...SOUND AFTER GOAL SCORED
755 SOUND 89,7:SOUND 89,3:SOUND 133,10
760 D=D+1:PRINT@20,"GOALS:"D
765 POKE 65495,0
770 GOTO 130
1000 REM...SET UP GRAPHICS
1005 FOR T=13 TO 20
1010 SET(2,T,4)
1020 NEXT T
1030 FOR T=2 TO 5
1040 SET(T,13,4):SET(T,20,4)
1050 NEXT T
1055 FOR P=3 TO 4:SET(17,P,3):NEXT P
1057 FOR P=30 TO 31:SET(17,P,3):NEXT P
1060 GOTO 160
2000 SS=0:DF=DF+1
2020 NN=DF:IF DF=LP THEN 5000
2030 GOTO 225
5000 CLS(3)
6000 PRINT@269,"SAVES:";L;"GOALS:";D
6005 IF WR<15 THEN 6000:REM... THIS CAN BE CHANGED!
6010 IF L>D THEN 6060
6020 IF D>L THEN 6050
6022 IF D=L THEN 6025
6025 PRINT@394,"CONGRATULATIONS"
6030 PRINT@423,"YOO BOTH TIED!!"
6033 GOTO 6055
6035 CLS(3):PRINT"PLAY AGAIN(Y/N)?"
6040 A$=INKEY$:IF A$="Y" THEN 90
6045 IF A$="N" THEN END
6047 IF A$<>"Y" AND A$<>"N" THEN 6040
6050 PRINT@394,"THE SHOOTER WINS"
6055 FOR I=1 TO 2000:NEXT I:GOTO 6035
6060 PRINT@394,"THE GOALIE WINS"
6070 GOTO 6055
6080 PRINT@394,"THE SHOOTER ONLY TOOK";WR;"SHOTS!"
6085 PRINT@424,"... SO THE GOALIE WINS"
6090 GOTO 6055
```


TEACHERS!

The Electronic Rollbook

Maintains disk files of your classes and grades, *calculates* averages and histograms, *prints* updated rollbook grade sheets, even *assigns* letter grades based on cutpoints that you supply!

Best of all, to enter new grades, there's no need to alphabetize, no need to type in the students' names, no searching through the pile, and no need to look up code numbers; just use the magic of The Electronic Rollbook.™ Classroom tested by college teachers for two years. Req. Model I or III, 48K, disk drive. Send just $39.95 to Report Card, Box 672, Bala Cynwyd, PA 19004 to get your program and complete documentation in time for fall classes.

✓541

✓See List of Advertisers on page 338

GAME

LOAD 80

A draw poker variation: three pair takes all.

Pitty Pat

Lynard Barnes
320 South Whipple Street
Chicago, IL 60612

In human versus human Pitty Pat, each player is dealt five cards from a fifty-two card deck. The object is to form three pairs using your original five cards, the draw and discard pile. Each time a player draws a card from the deck that matches one in his hand, he must discard a card. The first player to make three pairs wins the game.

In Pitty Pat chance operates on two levels: how far down in the deck is a matching card for one held by a player, and are some, or all, of the matching cards needed by one player held in the hand of the other?

Programmed to Cheat

Beating your TRS-80 in computerized Pitty Pat will be especially gratifying. The computer keeps track of which cards have been discarded and also keeps track of what cards you need. It accomplishes this by peeking at your hand (program lines 1000 and 1010). The advantage gained is not all that great—but it prevents your computer from giving you a winning card from its own hand. Winning a game is not everything. In Pitty Pat the real war is over points!

The Key Box

Basic Level II
Model I
16K RAM

Game, Set, Match

At the beginning of each set (from 5 to 20 games), each card within the four suits is assigned a point value. As cards are dealt, their values decline according to how often the suit has been dealt. Your strategy for capturing points is to draw cards from suits with higher point values and to weigh judiciously the value of the cards you discard.

You are excluded from capturing points from a particular suit if you are not dealt a card from that suit in your first hand. Though not a disastrous predicament, it does lessen your chances of winning the point war. It is hard, but you can still win more games than the computer and stop it from winning the set. On the other hand, you can get trounced trying.

The computer has no strategy for capturing points. It is at the mercy of chance and your skill. The better you are at capturing points, the worse off it is. In essence, the computer manipulates chance by peeking at your cards, and you manipulate chance by failing to match cards when you should, or by discarding one suit rather than another or by losing a game. The ultimate object is to win the set and as many games as possible. Pursuing a set winning strategy can be nerve rattling, but also, more satisfying. ■

Among other activities, Lynard Barnes teaches a course on micros at the Chicago Public Library.

Program Listing

```
0 '*************************************************************
1 '*    TITLE:          PITTY PAT - POKER VARIATION            *
  *    PURPOSE:        SUIT MANIPULATION FOR POINTS           *
  *                                                           *
2 '*    AUTHOR:         LYNARD BARNES                          *
  *                    320 SOUTH WHIPPLE ST                   *
  *                    CHICAGO, ILLINOIS 60612                *
3 '*                    SEPTEMBER, 1981                        *
  *************************************************************


10 CLEAR75:CLS:PRINTCHR$(23);:N=64:C$="********      ********";
   PRINT@138,STRING$(28,131);:PRINT@834,STRING$(28,176);:
   FORJ=1TO12:N=N+64:PRINT@N,CHR$(176);:PRINT@N+58,CHR$(149);:
   NEXT:PRINT@264,C$;:PRINT@394,"POKER GAME VARIATION - II";
20 PRINT@650,CHR$(197);"PITTY PAT";:PRINT@520,C$;:B=15##:
   GOSUB140
100 CLEAR120:DEFINTA-Z:DEFSTRC:CT=STRING$(10,131):CO=CHR$(191):
   CB="HEART":CC="CLUB":CS="SPADE":CI="DIA'':CO=CHR$(197):
   CJ="JACK":CQ="QUEEN":CE="ACE":CK="KING":CB="BUSINESS":
   CP="PLAY GAME":DEFSNGS,H,L,B,A,P;RANDOM:TS="###.##":CM="2"
110 RANDOM:DIMD(53),P(12,2),C(11,2):GOTO490:

SUB-ROUTINES
120 IFCY=CC,PD=1ELSEIFCY=CH,PD=2ELSEIFCY=CS,PD=3ELSE
    IFCY=CI,PD=4
130 RETURN
140 FORY=BTOB:NEXT:RETURN:REM

LOAD 52 CARDS
150 P=RND(2):U1=P(5,B):PO=B:L=1:G=1:G1=27:Q=1:PRINT@629
    ,"SHUFFLING";
160 IFL<=52THENONPGOTO170,180ELSEL=B:RETURN
170 D(L)=G:L=L+1:G=G+1:IFP=2,P=1:GOTO160ELSEIFP=1,P=2:GOTO160
180 D(L)=G1:L=L+1:G1=G1+1:IFP=2,P=1:GOTO160ELSEIFP=1,P=2:GOTO160

190 PRINT@629,"* STOCK *  ";:RETURN:REM

CLEAR ALL CARDS
200 FORJ=BTO11:FOAR=BTO1:PRINT@P(J,N),CO;:NEXT:NEXT:RETURN:REM

CLEAR BUSINESS AREA
210 RS=CHR$(224):PRINT@488,R$;:PRINT@464,R$;:PRINT@528,R$;:
    PRINT@591,R$;:PRINT@692,CO;:RETURN:REM

CLEAR ONE CARD
220 PRINT@650,R$;:PRINT@653,R$;:RETURN
230 PRINT@P(X,B),CO;:PRINT@P(X,1),CO;:RETURN:REM

POINTS SCORED
240 IFAP=B,RETURNELSEPRINT@488,"CAPTIVE :";A4;": TO WIN:";:
   PRINTUSINGT$;AC;:PRINT":";:PRINT@464,"YOUR.....";;
   PRINT@528,"SHARE: ";:PRINTUSINGT$;PE;:PRINT@592,"HOUSE: ";;
   PRINTUSINGT$;HP;
250 PRINT@488,"NT.....";:PRINT@544,"SHARE: ";:PRINTUSINGT$;BE
   ;:PRINT@658,"HOUSE: ";:PRINTUSINGT$;BG;:PRINT@663,"COMBINED:"
   ;:PRINTUSINGT$;AP;:GOSUB460:A5=(BP/PG)+(PG/BP):RETURN
260 PRINT@P(X,B),CX;:PRINT@P(X,1),CX;:RETURN:REM
MARK CARD MATCHES
270 C(V,B)="";:PRINT@P(X,B),";:";:RETURN
280 PRINT@P(X,B)+5,"B";:RETURN
290 PRINT@P(X,B)+5,"*";:RETURN:REM

DEAL A CARD
300 D(P)=B:P=RND(52):IFD(P)=BTHENGOTO300ELSEO=D(P)ELSEIFQ>=52
    ,RETURN
310 A2=A-VB:IFO<=13CX=CC:PC=1:LL=(LX*A2)/PI:LX=LX-1:
  PO=LLELSEIFO>=14ANDO<=26CX=CH:PC=2:D(P)=O-13:BT=(LT*A2)/PI:
  LT=LT-1:PO=BT
320 IFO>=27ANDO<=39CX=CS:PC=3:D(P)=O-26:SP=(LP*A2)/PI:LP=LP-1:
  PO=SPELSEIFO>=40CX=CI:PC=4:D(P)=O-39:SI=(LI*A2)/PI:LI=LI-1:PO=
SI
330 DC=D(P):CX=STR$(D(P)):IFD(P)=1CX=CEELSEIFD(P)=11CX=CJ
    ELSEIFD(P)=12CX=CQELSEIFD(P)=13CX=CK
340 AC=A5+((PG+BP)*.5):GOSUB1170:PI=PI-1:RETURN:REM

CHECK MATCHES
350 XF=5:FORXD=BTO4:F1=DL(XC):F2=PL(XF):FORXZ=BTO4:F3=DL(XZ):
    F4=PL(XZ+5):IFSC<=4,IFXZ<>XC,IFF1=F3,X=XC:GOSUB380:X=XZ:
    GOSUB380
360 IFXF<=9,IFXZ+5<>XF,IFF2=F4,J1=5:X=XF:GOSUB380:X=XZ+5:
    GOSUB380:J1=B
```

Program continues

Program continued

```
370 NEXT:XC=XC+1:XF=XF+1:NEXT:RETURN
380 IFJ1-5THENGOTO390ELSEE=E+1:GOSUB280:PRINT@P(X,0),C(X,0);:
    PRINT@P(X,1),C(X,1);:DL(X)=0: RETURN
390 E1=E1+1:PL(X)=0:GOSUB290:RETURN:REM

SET UP TABLE
400 K=0:Y=0:X=0:X1=192:X2=768:X3=960:C2=CD
410 PRINT@X+Y,CT;:PRINT@X1+Y,CT;:PRINT@X2+Y,CT;:PRINT@X3+Y,CT;:
    X4=X+Y:PRINT@X4,CD;:PRINT@X4+64,CD;:PRINT@X4+128,CD;:
    PRINT@X4+9,C2;:PRINT@X4+73,C2;:PRINT@X4+137,C2;:X4=X2+Y:
    PRINT@X4,CD;:PRINT@X4+64,CD;:PRINT@X4+128,CD;:PRINT@X4+9,C2
    ;
420 PRINT@X4+73,C2;:PRINT@X4+137,C2;:Y=Y+12:K=K+1:IFK=5,
    PRINT@374,CT;:PRINT@566,CT);:PRINT@373,C2;:PRINT@437,C2;:
    PRINT@501,C2;:PRINT@303,C2;:PRINT@447,C2;:PRINT@511,C2;:
    PRINT@565,CHR$(131);:GOTO430ELSEGOTO410
430 DATA 66,131.78,143.90,155,182,167,114,179,834,899,846,911,
        858,923,878,935,882,947,438,503,385,450:FORX=0TO11:
        FORY=0TO1:READP(X,Y):NEXT:NEXT:RESTORE:RETURN
440 PRINT@320,CT;:PRINT@512,CT;:PRINT@320,C2;:PRINT@384,C2;:
    PRINT@448,C2;:PRINT@329,C2;:PRINT@393,C2;:PRINT@457,C2;:
    PRINT@576,"" DISCARD "";:RETURN
450 PRINT@334,STRING$(35,130);:PRINT@718,STRING$(35,130);:
    FORM=1TO6:PRINT@334+N,CHR$(179);:PRINT@368+N,CHR$(179);:
    N=N+64:NEXT:N=0:RETURN:REM

KEY SCAN
460 IK$=INKEY$:PRINT@722,R$);:PRINT@692,"<KEY>";:GOSUB450
470 Z$=INKEY$:IFZ$=""THEN470ELSEZ=VAL(Z$):RETURN
480 M=351:FORM=1TO5:PRINT@M,CHR$(173);:M=M+64:NEXT:GOSUB1170:
  RETURN:REM

PROGRAM STARTS
490 CLS:PRINT@480,"DO YOU NEED INSTRUCTIONS <Y/N>";:GOSUB470:
  IFZ$="Y"THENGOTO122@ELSEPRINT@270,CB;:GOSUB210:GOSUB450:
  GOSUB210:GOSUB400:GOSUB150:PRINT@480,"SELECT BY LETTER...";

500 P=53:A=0:PRINT@529,"NUMBER OF GAMES IN THIS SET:";:
  PRINT@594," A       B       C       D";:
  PRINT@658," 5       10      15      20";:GOSUB470:
  IFI$="A",A=5ELSEIFZ$="B",A=10ELSEIFZ$="C",A=15
  ELSEIFZ$="D",A=20ELSEGOTO500
510 XA=RND(2):PI=52*A:LX=13*A:LT=LX:LP=LX:LI=LX:A4=PI*.3:A3=0
520 IFXA=1,XA=2ELSEIFXA=2,XA=1
530 PRINT@692,CO;:GOSUB210:GOSUB450:GOSUB240:GOSUB210:GOSUB440:
  PRINT @270,CP;V0+1;:GOSUB220:GOSUB150:GOSUB190:PRINT@654
  ,STRING$(35,130);:ONXAGOTO540,580:REM

COMPUTER DEALT
540 V=0:X=0:PRINT@640,CHR$(205):PRINT@256,"COMPUTER...";
550 GOSUB300:CV=CX:CY=CZ:GDSUB1060:GOSUB270:X=X+1:C(V,0)=CV:
  C(V,1)=CY:DL(V)=D(P):V=V+1:IFAP=0,SH(V-1)=PC:HG=HG+PO
560 IPV=5THEN570ELSE550
570 IPXA=2THEN620:REM

PLAYER DEALTH
580 X=5:V=5:PRINT@256,R$;:PRINT@704,"YOU.....";
590 GOSUB300:CV=CX:CY=CZ:GOSU8060:GOSUB260:X=X+1:C(V,0)=CV:
  C(V,1)=CY:PL(V)=D(P):V=V+1:IFAP=0,LH(V-6)=PC:HP=HP+PO
600 IPV=10THEN610ELSE590
610 Q=10:IPXA=2THENGOTO540:REN

DEALTH CARD MATCHES ?
620 G1=0:GOSUB350:PRINT@256,CHR$(204);:PRINT@704,CHR$(204);:
  XC=0:XF=0:IFE>=22THENGOTO1040
630 IPE1>=24THENGOTO810ELSEX=10:GOSUB230:CV=C(10,0):CY=C(10,1):
  GOSUB260:REM

DIVIDE BUSINESS AREA
640 A3=5:GOSUB480:PRINT@270,CP;V0+1;"OF";A;
650 IPXA=3THENGOTO920
660 X=10:GOSUB230:GOSUB300:CY=CZ:CV=CX:X=10:GOSUB260:Q=Q+1:
  ONXAGOTO670,920:REM

PLAYER PULLS CARD
670 PRINT@528,"YOUR DRAW....";:U=PEEK(14368):IFUAND8,XA=3:
  DD=0:GOTO650ELSEIFU=128THENGOSUB210:GOSUBI130:GOSUB460:
  GOSUB210:PRINT@654,STHING$(35,130);:PRINT@692,CHR$(254);:
  GOSUB480:GOTO670ELSEIFU<>0THENGOTO700

680 U1=U1+1:IFU1>=10,U1=5
690 GOSUB740:FORY=1TO100:NEXT:GOSUB750:GOTO670
700 U=PEEK(14368):IFUAND16THENGOSUB750:IFU1<=5,U1=5:
  GOSUB740ELSEU1=U1-1:GOSUB740
710 IFUAND64THENGOSUB750:IFU1+1>=10,U1=9:GOSUB750ELSE
  U1=U1+1:GOSUB740
720 IFUAND8,XA=3:DD=0:GOTO650ELSEIFU<>8ANDU<>16ANDU<>64
  ,PRINT@528,"KEYS:< > +";:GOSUB750:B=1500:GOSUB140:GOTO670
730 GOSUB470:IFZ$="S",XW=1:GOTO760ELSEIFZ$="D",XW=2:
  GOTO760ELSEIFZ$=CHR$(13),XA=2:DD=0:GOTO920ELSE700
740 PRINT@P(U1,0)-128,CHR$(92);:RETURN
750 PRINT@P(U1,0)-128," ";:RETURN
760 PRINT@528,"YOU TAKE....";:IFPL(U1)=0,PRINT@704
  ,"PENALTY: .5 POINT";:BU(U1-5)=BU(U1-5)-.5:PRINT@P(U1,0)+5," "
;:
  GOSUB140:PRINT@704,CHR$(212);:GOTO920ELSEX=U1:GOSUB290:
  GOSUB820:ONXWGOTO770,780,920:REM
PLAYER-STOCK
770 GOSUB1170:D(P)=0:DD=PL(U1):X=11:GOSUB230:X=U1:GOSUB230:X=11
  :CV=C(U1,0):CY=C(U1,1):GOSUB900:GOSUB260:C(11,0)=CV:C(11,1)
  =CY:PL(U1)=0:X=U1:CY=CZ:GOSUB860:CV=CX:GOSUB260:DC=0:GOTO810:
REM
PLAYER-DRAW DISCARD
780 GOSUB1170:DD=PL(U1):X=11:GOSUB230:X=U1:GOSUB230:CV=C(11,0):
  CY=C(11,1):GOSUB860:X=U1:GOSUB260:CV=C(U1,0):CY=C(U1,1):X=11:
  GOSUB900:GOSUB260:PL(U1)=0:GOTO810:REM

CHECK PLAYER WIN
790 E1=0:FORY=5TO9:IFPL(Y)=0,E1=E1+1:NEXTELSENEXT
800 RETURN
810 GOSUB790:IFE1>=5PRINT@528,"PRESS ANY KEY";:
  PRINT@704,"YOU WIN....";:GDSUB470:PI=PI+I:GOTO1120
  ELSE:XA=1:GOTO920
820 FORJ=5TO9:IFDC=PL(J)ANDZ$<>"D",DC=0:PL(J)=0:GOSUBI170:
  X=J:GOSUB290:RETURN
830 IFDD>=1ANDDD=PL(J),PL(J)=0:GOSUBI170:X=J:GOSUB290:RETURN
840 NEXT
850 BU(U1-5)=BU(U1-5)-.25:PRINT@704,"PENALTY: .25 POINT";:
    B=900:GOSUB140:PRINT@704,CHR$(212);:PRINT@P(U1,0)+5," ";:
    XW=3:RETURN:REM

SUITS-PLAYER
860 IFA3=0THENGOTO880ELSEFORY=0TO4:IFLH(Y)=PCTHENGOTO880ELSENEXT

870 RETURN
880 IFCY=CC,BU(0)=BU(0)+LLELSEIFCY=CH,BU(1)=BU(1)+HTELSEIF
  CY=CS,BU(2)=BU(2)+SPELSEIFCY=CI,BU(3)=BU(3)+SI
890 PE=0:BP=0:FORY=0TO3:BP=BP+BU(Y):NEXT:PE=BP:RETURN
900 GDSUB790:IFE1>=4,RETURNELSEGOSUB120:FORY=0TO4:IFLH(Y)<>PD,
  NEXTELSEIFCY=CC,BU(0)=BU(0)-LLELSEIFCY=CH,BU(1)=BU(1)-HTELSE
  IFCY=CS,BU(2)=BU(2)-SPELSEIPCY=CI,BU(3)=BU(3)-SI
910 GOTO890:REM

COMPUTER PULLS
920 PRINT@528,CHR$(205);:PRINT@545,"MY DRAW..";:IFDD=0THENGOTO
  940ELSEFORJ=0TO4:IPDL(J)=DDTHENX=J:GOSUB230:GOSUB280:DL(J)
  =0:CV=C(J,0):CY=C(J,1):GOSUB260:GDSUB970:CV=C0:CY=C9:GOSUB
  1060:GOSUB260:GOSUB1170:XC=5:GOTO1040
930 NEXT:DD=0
940 IFDC=0THENXA=2:XC=9:GOTO660
950 FORJ=0TO4:IFDL(J)=DCTHENX=J:GOSUB230:GOSUB280:CV=C(J,0):
  CY=C(J,1):GOSUB260:D(P)=0:DL(J)=0:GOSUB970:CV=CX:CY=CZ:
  GOSUB1060:GOSUB1170:X=I:GDSUB260:GOSUB280:X=10:GOSUB230:
  GOSUB300:Q=Q+1:CY=CZ:CV=CX:GDSUB260:GDTO1040
960 NEXT:B=300:GOSUBI40:PRINT@545,CHR$(202);:IFXC=9,XC=8:
  GOTO670ELSEIFXA=2,XA=1:GDTO670ELSEIFXA=3,XA=1:GDTO660ELSE
  GOTO660
970 IFJ>=5THENGOTO920ELSEPRINT@545,"I TAKE...";:FORI=4TO0STEP
  -1:IPDL(I)=0THENGU=GU+1:GOTO990ELSEGOTO1000
980 IFGX<>1ANDGU<6THENX=11:GOSUB230:CV=C(I,0):CY=C(I,1):GOSUB
  1100:GOSUB260:C0=C(11.0):C9=C(11,1):X=I:GOSUB
  230:GOSUB280:C(11.0)=C(I,0):C(I1,1)=C(I,1):DD=DL(I):DL(I)=0:
  GX=0:GU=0:RETURN
990 NEXT:GX=0:GU=0:IFI<0THENFORI=1TO3:IFDL(I)<>0THENGX=0:GU=0
  :GOTO980ELSENEXTELSEGX=0:GU=0:GOTO980
1000 GX=0:FORJX=5TO9:DC=PL(JX):IFUC>0ANDUC=DL(I),CK=GX+1
1010 NEXT:GOTO980:REM
CHECK COMPUTER WIN
```

Program continues

MOVING?

Let us know 8 weeks in advance so that you won't miss a single issue of 80micro

Attach old label where indicated and print new address in space provided. Also include your mailing label whenever you write concerning your subscription. It helps us serve you promptly.

☐ Address change only
☐ Extend subscription
☐ Enter new subscription
☐ Payment enclosed (1 extra BONUS issue)
☐ Bill me later
☐ 1 year $24.97

Canadian $27.97 US funds, Foreign surface $44.97 US funds, DRAWN ON US BANK ONLY. Foreign air mail please inquire.

If you have no label handy, print OLD address here.

AFFIX LABEL

Name _____
Address _____
City _____ State _____ Zip _____

print NEW address here:

Name _____
Address _____
City _____ State _____ Zip _____

80 MICRO P O Box 981 ● Farmingdale NY 11737 ●

Model II & Model 16 users:

two/sixteen, a new magazine which serves the interests of business, professional, and scientific users of Radio Shack Model II and 16 micro computers, is gaining wide acceptance with subscribers in 13 countries from Singapore to Cincinnati to Sweden. Enough first issues remain for just one-tenth of the Model II population. Until they're gone, bi-monthly one-year Charter Subscriptions are available at $30. Canada $36 US, Other $47 US; Foreign Air Mail $67 US. Prepaid VISA or MasterCard only. The May/June (first issue) mailed within 24 hours of order.

(717) 393-1917, any day or
P.O. Box 1216, Lancaster, PA 17603.

two/sixteen™ magazine

522

is HARD COPY STORAGE a problem?

Here's the ideal way to keep your growing collection of *80 Micro* in order! The *80 Micro* Library Shelf Boxes

. . . sturdy, corrugated, white, dust-resistant boxes will keep your issues of *80 Micro* orderly and available for constant reference. Self-sticking labels are available for the boxes, too, not only for *80* but also for *Microcomputing, 73 Magazine, CQ, QST, Ham Radio, Personal Computing, Interface Age, Byte* and *Radio Electronics*. Ask for whichever labels you want with your box order. Each box holds a full year of the above magazines. Your magazine library is your prime reference: Keep it handy and keep it neat with these strong library shelf boxes. One box (BX1000) is $2.00, 2-7 boxes (BX1001) are $1.50 each, and 8 or more boxes (BX1002) are $1.25 each. Be sure to specify which labels we should send. *Shipping and handling charges are $2.00 per order. Call in your credit card orders on our toll-free line 800-258-5473, or use the order card in the back of the magazine and mail to:*

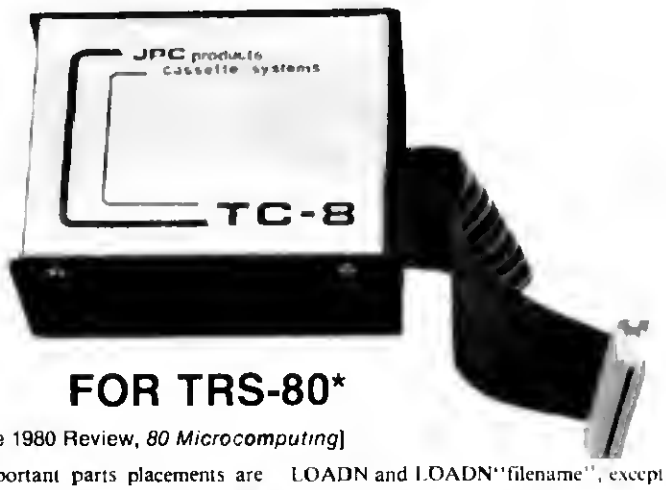
80micro
ATTN: BOOK SALES
Peterborough, NH 03458
Please allow 4-6 weeks for delivery. No COD orders accepted.

Program continued

```
102# G=0:FORJ=0TO4:IFDL(J)=0,G=G+1:NEXTELSENEXT
103# RETURN
104# GOSUB1020:PRINT@545,CHR$(205);:IFG=5
  PRINT@545,"PRESS ANY KEY";:PRINT@256,"I WIN....";:GOSUB470:
  GOSUB470:NN=NN+1:GOTO1120
105# IFXC=0THENGOTO670ELSEIFXC=5THENXC=0:GOTO660ELSE
  XC=0:GOTO670ELSEIFXA=2THENGOTO670:REM

SUITS - COMPUTER
106# IFA3=0THENGOTO1080ELSEFORY=0TO4:IFSH(Y)=PCTHENGOTO1080ELSEN
EXT
107# RETURN
108# IFCY=CC,SU(0)=SU(0)+LLELSEIFCT=CN,SU(1)=SU(1)+HTELSEIF
   CY=CS,SU(2)=SU(2)+SPELSEIFCY=CI,SU(3)=SU(3)+SI
109# HE=0:PG=0:FORY=0TO3:PG=PG+SU(Y):NEXT:HE=PG:RETURN
110# GOSUB1020:IFG>=4,RETURNELSEGOSUB1120:FORY=0TO4:IFSH(Y)<>PD,
   NEXTELSEIFCY=CC,SU(0)=SU(0)-LLELSEIFCY=CN,SU(1)=SU(1)-HTELSE
   IFCY=CS,SU(2)=SU(2)-SPELSEIFCY=CI,SU(3)=SU(3)-SI
111# GOTO1090:REM

GAME STATUS
112# U=0:V0=V0+1:E=0:E1=0:Q=0:KF=0:XC=0:GOSUB200:GOSUB210:GOSUB2
20:
GOSUB450:PRINT@405,"GAMES WON";:PRINT@468
,"YOU";:PRINT@477,"ME";:PRINT@532,PZ;:PRINT@541,NN;:GOSUB460:
GOSUB210:GOSUB1130:GOTO1150
113# GOSUB220:GOSUB450:BP=0:PG=0:PE=0:HE=0:PRINT@403,CC";";:
PRINT@466,CH;";";:PRINT@530,CS;";";:PRINT@591,"DIAMONDS:";:
PRINT@657,"POWERS:";:
PRINT@660,"YOURS";:PRINT@679,"MINE";:M=411:M1=421
114# FORY=0TO3:PRINT@M,USINGT$;BU(Y);:PRINT@M1,USINGT$;SU(Y);:
   M=M+64:M1=M1+64:BP=BU(Y)+BP:PG=SU(Y)+PG:NEXT:PE=PE+BP:
   NE=HE+PG:AP=PE+HE:RETURN
115# GOSUB460:GOSUB210:GOSUB220:GOSUB1180:GOSUB190:IFV0+1<
=ATHENGOTO520
116# LW=AC:IFPE>=LWORHE>=LWTHENC="SET ESTABLISHED:":GOTO1190
     ELSEC="NO SET:":GOTO1190:REM

PNTS IN HAND
117# PRINT@480,"YOU:";:PRINTUSINGT$;BP;:PRINT@417,"ME:";:
 PRINTUSINGT$;PG;:RETURN:REM

CLEAR MARKERS
118# FORY=0TO9:PRINT@P(Y,0)+5," ";:NEXT;RETURN:REM

END SET
119# CLS:PRINTC;:GOSUB450:GOSUB240:GOSUB1350:CLS:PRINT@128,"";:
PRINT"WINNING POINTS:";AC:PRINT:
PRINT"YOUR POINTS:";BP;CHR$(210);"MY POINTS:";PG:PRINT:LW=AC:
IFPE>=LWTHENC="YOU "ELSEIFHE>=LWTHENC="I "ELSEC="YOU NOR I "
120# PRINTC;"ACCUMULATED ENODGE POINTS TO WIN THE SET.";
PRINT"OUT OF";A;" GAMES, YOO WON";PZ;" AND I WON";NN;".";
PRINT"A TOTAL OF";(52*A)-(PI+(10*A));"CARDS WERE DRAWN."
121# K=13*A:PRINT:PRINT"CARDS DAWN.....";
PRINT,CC,";";X-LA,CS;";";X-LT:PRINT,CS;";";X-LP,CI;";";X-LI;
PRINT:PRINT"DO YOO WANT TO PLAY AGAIN (Y/N) ?";:GOSUB470:
IF$$="Y"THENGOTO100ELSEIFZ$="N"CLS:ENDELSEGOTO1190:REM
INSTRUCTIONS
122# A=15:GOSUB1340:PRINT"OBJECTIVE:";:
PRINTTAB(A)"TO WIN AS MANY GAMES AND COLLECT AS MANY";
PRINTTAB(A)"POINTS AS POSSIBLE DURING ONE 'SET'.";PRINT
123# PRINT"PROCEDURE";:
PRINTTAB(A)"GANE PLAY BEGINS WHEN EACH PLAYER (YOO";
PRINTTAB(A)"& COMPUTER) ARE DEALT 5 CARDS AND AT LEAST";
PRINTTAB(A)"ONE CARD IN YOOR RESPECTIVE HANDS DO NOT";
PRINTTAB(A)"MATCH THE FACE VALUE OF ONE OR NORE OF YOUR"
124# PRINTTAB(A)"OTHER CARDS. FOR AN EXANPLE, PRESS ANY KEY..";
GOSUB470:CN="4";
CF="PLAYER NEEDS A '2' TO END GAME AND WIN":GOSUB1330:B=1000:
GOSUB1350
125# GOSUB1340:PRINT"PROCEDURE:";:
PRINTTAB(A)"YOO'LL PICK THE NUMBER OF GAMES TO BE PLAYED";
PRINTTAB(A)"IN THE 'SET'. A SET EXISTS WHEN EITHER PLAYER";
PRINTTAB(A)"CAPTURES ALL OR NORE OF THE 'TO WIN' POINTS.'
126# PRINT:PRINT"SCORING:";:
PRINTTAB(A)"POINTS ARE CAPTURED BY INCREASING THE POWER OF A"
127# PRINTTAB(A)"SUIT CONTAINED IN YOUR 'HOUSE'. SUITS DEALT IN"

:PRINTTAB(A)"YOUR FIRST HAND (HOUSE) DETERMINE WHICH SUITS"
:PRINTTAB(A)"YOO MUST DRAW TO INCREASE YOUR POINTS. DISCARD-"
128# PRINTTAB(A)"ING A HOUSE SUIT DECREASES ITS POWER TO CAPTURE
"
:PRINTTAB(A)"POINTS. POINT VALUE IS DETERMINED ON A DESCEND-";
PRINTTAB(A)"ING PROABILITY SCALE.";:B=1000:GOSUB1350:GOSUB1340
129# PRINT"PENALTIES:";:
PRINTTAB(A)"IF AN ATTEMPT IS MADE TO MATCH A CARD UNDER";
PRINTTAB(A)"THE FOLLOWING CONDITIONS, POINTS ARE DEDOCTED:"
:PRINTTAB(20)"CARD MARKED WITH '*'";
PRINTTAB(20)"HAND DOES NOT CONTAN POSSIBLE MATCH."
:PRINTTAB(20)"DRAW FROM ";
130# PRINT"DISCARD AFTER LEGAL TURN.";PRINT:PRINT"PLAY:";:
PRINTTAB(A)"FOR PLAY OPERATIONS, PRESS ANY KEY":
GOSUB470:CLS:GOSUB480:GOSUB190:GOSUB440:PRINT@480
,"TO DRAW FROM STOCK OR DISCARD:";:PRINT@706,CHR$(92);:
PRINT@464,"POSITION ARROW OVER UN-MATCHED",
131# PRINT@528,"CARD WITH: '<' TO MOVE LEFT";:
PRINT@592,CNR$(203);"'>' TO MOVE RIGHT";:
PRINT@656,"THEN TYPE 'S' OR 'D' TO TAKE.";:GOSUB460:GOSUB210:
PRINT@656,R$;:PRINT@480,"IF YOU DO NOT NEED THE CARD";:
PRINT@464,"IN STOCK, PRESS '+'.";
132#
PRINT@656,"* YOU DO NOT USE SHIFT-KEY *";:GOSUB460:GOSUB210:
PRINT@656,R$;:PRINT@480,"TO CHECK STATUS OF HOUSE.";:
PRINT@464,"PRESS '/' DURING YOUR DAWN.";:GOSUB460:CLS:GOTO490
133# PRINT@785,CJ;CO;CJ;CO;CJ;CO;"  ";CM;CO;"  ";CN;:
PRINT@849,CC;CO;CS;CO;CI;CO;CC;CO;CN;:PRINT@968,"SIGNIFICANCE:";
:
PRINTTAB(15)CF;:RETURN
134# CLS:PRINT"PITTY PAT";:PRINTCHR$(222);"POKER VARIATION II"
:PRINTSTRING$(64,131);:RETURN
135# GOSUB140:B=300:PRINT@768,"PRESS";:PRINT@832,"ANY";:
PRINT@896,"KEY";
136# GOSUB140:PRINT@704,CO;" ";:PRINT@768,CO;:PRINT@832,CO;:
PRINT@896,CO;:GOSUB140:IFINKEY$=""THEN135ELSERETURN
137# END
```

HIGH SPEED CASSETTE SYSTEM

Poor Man's Floppy



FOR TRS-80*

Now the widely acclaimed JPC Cassette System is available for your TRS-80* computer. The price is only $90.00

[Reprint of June 1980 Review, *80 Microcomputing*]

TC-8 Cassette System
JPC Products
Albuquerque, NM
Kit: $90
Assembled: $120

by Carl A. Kollar

I guess I don't have to tell any TRS-80 owners how frustrating the cassette system that comes with the computer can be. Even with the factory mod that's available, the annoyance of loading and checking programs becomes just barely tolerable.

If you're like me, after you've just plunked down a chunk of money for a Level II 16K machine, "you ain't got nuttin left" for even one disk drive at 500 bucks apiece. So you suffer.

A reasonable alternative is the Exatron Stringy Floppy (ESF). This will cost you about 250 bucks and totally eliminates your loading and saving problems, automatically and fast. I've had one of these for about six months and love it!

But, if the price is still too steep, have I got a device for you!

The Device

The February 1980 issue of *Microcomputing* had an ad that intrigued the hell out of me. It was a high-speed cassette system by JPC Products acclaimed as a "poor man's floppy." It made all sorts of seemingly ridiculous claims such as "loads five times faster," "stores 50,000 bytes on a 10-minute cassette," "less than one bad load in a million bytes with the volume control anywhere between one and eight."

All this for a measly [90] bucks? How could this be? A call to Albuquerque answered a few questions: Yes, it had its own power supply, and, it stored programs five times faster because it utilized higher density data. The computer outputs the information at a higher rate out of the rear keyboard connector.

The ad had even claimed anyone could build it even if you have never soldered before. JPC would make it work, if you couldn't—for free. I was sold. I placed my order, and it arrived about two months later (parts shortage).

I work in electronics, so I found the unit exceptionally easy to build. It took about an hour. The manual is superb. (That's better than great.) It was clear, concise and exact with no ambiguities. Important parts placements are stressed (polarity markings on electrolytics, bands on diodes, etc.).

JPC was right! With these instructions, you couldn't go wrong. The board quality is excellent. It is double-sided and parts locations are clearly marked on the component side of the board. There are no jumper wires to install. JPC utilizes PC traces and plated-through holes for connections to traces on the other side of the board.

Also, there are absolutely no adjustments or settings to bother with.

The documentation is a sheaf of 8½ × 11 papers stapled together. It is written in the nicest format I've seen in a while. Each command and/or subjects is covered on its own sheet in large type. All explanations are in easy to read English—not computerese.

Commands and Features

SAVE"filename": Saves your BASIC program on cassette.
LOAD: Reads the next BASIC program from the cassette.
LOAD"filename": Searches for and loads the specified file from cassette.
LOAD? and LOAD?"filename": Reads file from cassette, and compares contents to memory.
LOADN: Prints a list of all the programs on a cassette, until interrupted by the "break" key.
LOADN"filename": Same as above except the tape will stop at the end of the program named.
KILL: Removes the file manager program from memory so that the extra memory can be used by large programs.
RSET: Allows the operator to rewind and position the tape on tape recorders that have these functions tied to the motor control jack.
RUN"filename": TC-8 searches for a specified program and runs it immediately.
PUT"filename": Same as SAVE "filename", except it is for use with system tapes.
GET: Same as LOAD, except it is for use with system tapes.
GET"filename": Same as LOAD "filename", except it is for use with system tapes.
GET? and GET?"filename": Same as LOAD? and LOAD?"filename", except it is for use with system tapes.
GETN and GETN"filename": Same as LOADN and LOADN"filename", except it is for use with system tapes.
OPEN: Required before cassette input or output of a data file can be attempted.
CLOSE: Required to end a cassette data file.
PRINT#: Allows numerical or string data to be output to a cassette file.
INPUT#: Allows numerical or string data to be input from a cassette file.

I haven't counted them, so I don't know about the "one load in a million bytes" claim, but my son, Anthony (age 11), loaded about 30 of his programs from his Radio Shack format tape to a new TC-8 format tape. He's run them all and found no bad loads.

Unlike the standard tape system, you can position your tape anywhere before the program you want and not have to look for a blank spot between programs. The TC-8 patiently waits for the program you want and then starts loading without getting confused by the portion of the previous program you just fed it.

Try that on your regular cassette system; you'll wear out the reset button. ■

ORDER NOW

To order your TC-8 kit, send your check or money order for $90.00 plus $3.50 postage and handling to JPC PRODUCTS CO., 12021 Paisano Ct., Albuquerque, NM 87112 (New Mexico residents add 4% sales tax). Credit card orders accepted by phone or mail. Personal checks will delay shipment. We will otherwise immediately ship you the TC-8 kit, the cabinet, the ribbon cable, the power adapter, an instruction manual, and a cassette containing the software.

For Mod I Level II only.

✓ 42
JPC PRODUCTS CO.
Phone (505) 294-4623
12021 Paisano Ct.
Albuquerque, N.M. 87112

✓See List of Advertisers on page 338

LOAD 80

Help the little buggers munch your CRT.

Termites

Photo 1. The termite has hit a knot in column five

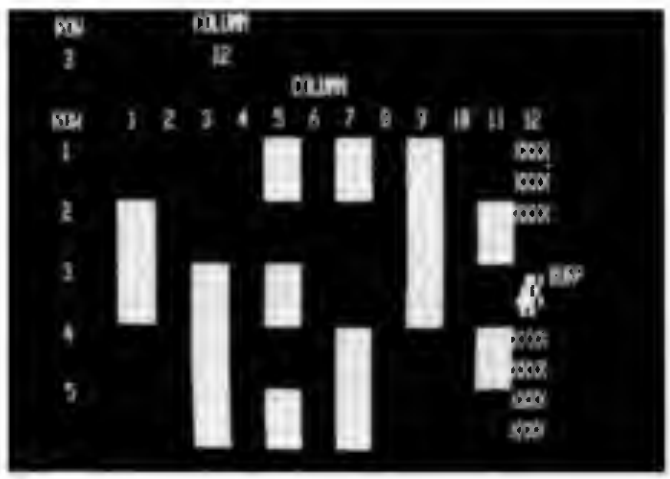


Photo 2. Here the termite has made it through the cherry wood treat (Xs) at a column 12

Charles Weindorf
2828 Legion Road
Erie, PA 16506

Termite is a one player, invisible maze game designed to improve your memory. The idea is to help a termite navigate a block of pine wood without hitting any knots. This program includes e sound routine of the termite chomping wood.

The knots in the wood are in odd columns only. There are one, two or three knots in each odd column. If the termite hits a knot, he goes back to start. If the termite reaches the twelfth column, you win.

Levels of Play

The game varies from level one, a fairly simple maze, to level four, a hair pulling course.

If a knot is hit in level one, the board is reset and the termite goes back to the start. When the termite hits a knot in level two, the board is reset and all knots in the one previous odd column move down one row. So, if the termite hits a knot in column five, the knots in column three, in rows one, four and five, move down into rows two, five and one.

In level three the knots move down in all odd columns. Level four will test your soul. If the termite hits a knot, all the knots in all odd columns move down, end all the odd columns move to the next odd column on the right, with the eleventh column moving to the first column. If the termite hits e knot, the knots in column seven, rows two, three end four move down and to the right. The knots will now be in column nine, rows three, four and five. I suggest keeping track on a piece of paper.

How to Play

After choosing a level of play, plot a path for the termite to take using the keys F (forward), U (up) and D (down). After plotting, the termite will start to chew his way through the wood. If a knot is hit, the board is reset, the termite goes back to the start and the knots are moved according to the particular level. If the termite reaches the end, he jumps for joy.

Strategy

Avoid moving up or down in the odd numbered columns. The most direct path between columns one and twelve is the easiest to remember. ■

The Key Box

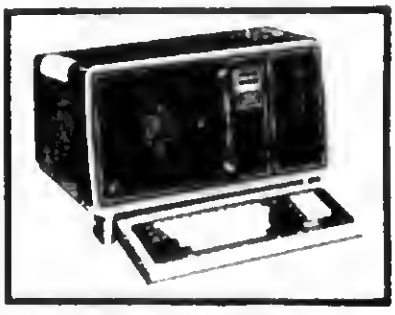
Model I
Level II
16K RAM

Program Listing

```
1 CLEAR1000
2  CLS:INPUT"ENTER A NUMBER UP TO 1000";A:A=RND(A):A=0
3 RANDOM
4 T$(5)=CHR$(191)+CHR$(135)+CHR$(155)+CHR$(175)
5 T$(1)=" "+CHR$(184)+CHR$(164)+CHR$(144)
6 T$(2)=CHR$(130)+CHR$(131)+CHR$(137)+" "
7 T$(3)=" "+CHR$(184)+CHR$(164)+CHR$(132)
8 T$(4)=CHR$(130)+CHR$(135)+CHR$(133)+CHR$(129)
9 T$(6)=CHR$(181)+CHR$(180)+CHR$(182)+CHR$(191)
10 OIM KN(7,3),KR(6,5)
11 T=0:FOR X=1TO6:FORX1=1TO3
12 KN(X,X1)=RND(5)
13 NEXT:NEXT
20 GOSUB 1000
25 CLS:PRINT"WOULD YOU LIKE DIRECTIONS?"
26 K$=INKEY$:IFK$=""THEN26
27 IFK$="Y"GOSUB3000:GOTO20
28 CLS:INPUT"ENTER YOUR LEVEL  1 - 4";DI:IFDI<1ORDI>4THEN20
30 GOSUB 1500
35 M$="":P=515:H=515
40 PRINT@0,"PLOT THE TERMITE'S PATH. U = UP , O = DOWN , F = FOR
WARD.";
50 I$=IHKEY$:IFI$<>"U"ANDI$<>"O"ANDI$<>"F"THEN50
70 M$=M$+I$
80 IFI$="F"THENP=P+4:GOTO95
90 IFI$="U"THENP=P+128ELSEP=P-128
95 PRINT@H,"    ";:PRINT@H+64,"    ";
100 IFP<256ORP>832THEN250
110 PRINT@P,T$(1);:PRINT@P+64,T$(2);
120 H=P
130 FORX=387TO819STEP128
140 IFP=XTHEN200
150 NEXT
199 GOTO40
200 PRINT@0,STRING$(60," ");:PRINT@0,"IS THIS PATH GOOD";
201 K$=INKEY$:IFK$=""THEN201
202 IFK$="N"THEN30
203 IFK$<>"Y"THEH201
204 T=T+1
205 FORL=1TO1000:NEXT
210 GOTO500
250 FORL1=1TO5:PRINT@0,"YOU HAVE GONE OFF THE BOARD. TRY AGAIN."
;
251 PRINT"                    ";
255 FORL=1TO300:HEXT
256 PRINT@0,"                                        ";
257 FORL=1TO100:NEXT:NEXT
260 GOSUB1500:GOTO35
500 CLS:GOSUB1500:P=515:H=515
505 PRINT@0,"ROW            COLUMN";
510 FORZ=1TOLEN(N$)
520 IFNIO$(N$,Z,1)="F"THENI=2:S1=20:S2=0:S3=0:S4=0:GOTO545
530 IFNIO$(N$,Z,1)="U"THENI=-64:S1=5:S2=10:S3=10:S4=0:GOTO545
540 IFNIO$(N$,Z,1)="O"THENI=64:S1=10:S2=0:S3=5:S4=10:GOTO545
545 PRINT@H,"    ";:PRINT@H+64,"    ";
546 P=P+I:H=P
550 PRINT@P,T$(3);:PRINT@P+64,T$(4);
565 GOSUB5000
570 PRINT@H,"    ";:PRINT@H+64,"    ";
575 P=P+I:H=P
576 R=INT(P/128)-1:CO=(P-((R+1)*128+3))/4
577 C1=CO/2+.5:PRINT@64,R,CO;
580 PRINT@P,T$(1);:PRINT@P+64,T$(2);
581 GOSUB5000
582 IFCO/2=INT(CO/2)THEN590
583 FORCH=1TO3:IFKN(C1,CH)=RTHENGOSUB2000:GOTO30
584 NEXT
590 NEXT
591 FOR X=1TO7:PRINT@P,"    ";:PRINT@P+64,"    ";
592 PRINT@P-64,T$(3);:PRINT@P,T$(4);
593 S1=5:S2=0:S3=5:S4=0:GOSUB5000:PRINT@P-64,"    ";:PRINT@P,"
  ";
594 PRINT@P,T$(1);:PRINT@P+64,T$(2);
595 S1=5:S2=10:S3=0:S4=10:GOSUB5000:NEXT:FORL=1TO100:NEXT
596 PRINT@P,T$(3)"BURP";:PRINT@P+64,T$(4);
597 S1=35:S2=20:S3=0:S4=20:GOSUB5000:GOSUB6995:GOTO4000
1000 CLS
1005 GOSUB6000
1010 PRINT@470,"T  E  R  M  I  T  E"
1020 TA$=T$(1):TB$=T$(2)
1030 K=1
1040 FORX=448TO492STEP2
1045 PRINT@X-2,"    ";:PRINT@X+62,"    ";
1050 PRINT@X,TA$;:PRINT@X+64,TB$;
1055 IFX<468ORX>486THENS1=4:S2=10ELSES1=10:S2=0
```

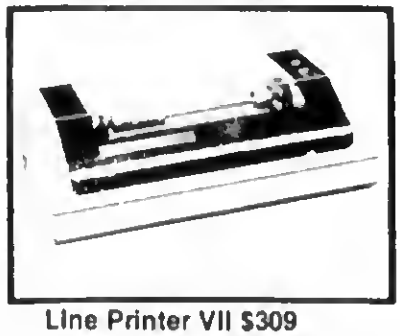
Program continues

We have THE LOWEST PRICES ON TRS-80™



Model II 64K $3049

Model III 16K $829



Line Printer VII $309

OKIDATA	Microline 80	$394
	Microline 82	$499
EPSON MX-70		$369
EPSON MX-80		$479

$ SAVE $

MOST ORDERS SHIPPED WITHIN ONE BUSINESS DAY

VERBATIM DATALIFE™ DISKETTES

5¼ inch (box of 10)	$25.95
8 inch Double-Density	$43.95

*Above prices reflect a cash discount. Payment: Money Order, Cashier's Check, Certified Check, Personal Checks require 3 weeks to clear.

WRITE OR CALL FOR OUR COMPLETE PRICE LIST

CALL (602) 458-2477

All prices are mail order only

RAND'S

2185 E. FRY BLVD.

and

101 W. FRY BLVD.

SIERRA VISTA, AZ 85635

TRS-80 is a trademark of Tandy Corporation

See List of Advertisers on page 338

80-U.S.

THE TRS-80 USERS JOURNAL

If you own a TRS-80® Model I, Model II, Model III, Color Computer or Pocket Computer,

YOU NEED 80-U.S. JOURNAL!

80-U.S. Journal has programs for your enjoyment and enlightenment. Every monthly issue contains several BASIC or machine language program listings. It contains business articles and tutorials. There is something for YOU in 80-U.S. Journal.

and . . .

80-U.S. Journal contains reviews of hardware and software. Our eveluations and reviews will help you to make the best choice in selecting additions to your system.

Pleasa send a ☐ new ☐ renewal subscription to 80-U.S. Journal for ☐ 1 year ($16), ☐ 2 years ($31), ☐ 3 years ($45) — U.S. residents only.

Name _____

Address _____

City _____

State _____ Zip _____

Visa/MC _____

Exp. _____

80-U.S. Journal, 3839 S. Warner Street, Tacoma, WA 98409, (206) 475-2219

Dealer Inquiries Invited

✓ 329

8M

Program continued

```
1056 GOSUB5000
1060 IFK=1TRENK=3ELSEK=1
1070 TA$=T$(K):TB$=T$(K+I)
1075 FORL=1TO30:NEXT
1000 NEXT
1002 PRINT@492,T$(1);:PRINT@556,T$(2);
1003 FORL=1TO300:NEXT
1090 PRINT@492,T$(3)" BURP";:PRINT@556,T$(4);
1091 S1=20:S2=35:S3=0:S4=20:GOSUB5000
1092 PRINT@492,T$(1)"      ";:PRINT@556,T$(2);
1099 RETURN
1500 CLS:PRINT:PRINT
1502 PRINTTAB(26);"COLUMN"
1505 PRINT"ROW     1   2   3   4   5   6   7   8   9   10  11  1
2"
1510 FORL=1TO5.5STEP.5
1520 IFL=INT(L)THENPRINTL;ELSEPRINT"   ";
1530 PRINT"    "STRING$(44,CHR$(191));"XXXX"
1540 NEXT
1545 PRINT@515,T$(1);:PRINT@579,T$(2);
1550 RETURN
2000 FORA7=1TO4:PRINT@0,STRING$(128," ");:PRINT@20,"K N O T";
2005 FORY=1TO15
2010 PRINT@P,T$(1);:PRINT@P+64,T$(2);:FORX=1TO40:NEXT
2020 PRINT@P,T$(5);:PRINT@P+64,T$(6);:FORX=1TO40:NEXT
2030 NEXT
2054 S1=7:S2=0:S3=0:S4=0:FORA6=1TO22STEP3
2055 S2=A6:GOSUB5000:NEXT
2060 FORL=1TO2000:NEXT
2070 ONDIGOTO2499,2100,2200,2200
2100 REM DI=2
2105 IFC1=1THEN2150
2110 FORX=1TO3
2120 IFKN(C1-1,X)=5TRENKN(C1-1,X)=1:GOTO2140
2130 KN(C1-1,X)=KN(C1-1,X)+1
2140 NEXT
2150 RETURN
2200 REM DI=3
2210 FORX1=1TO6:FORX=1TO3
2220 IFKN(X1,X)=5THENKN(X1,X)=1:GOTO2240
2230 KN(X1,X)=KN(X1,X)+1
2240 NEXT:NEXT
2245 IFOI=4TREN2300
2250 RETURN
2300 REM DI=4
2310 R1=KN(6,1):R2=KN(6,2):R3=KN(6,3)
2320 FORX1=5TO1STEP-1:FORX=1TO3
2330 KN(X1+1,X)=KN(X1,X)
2340 NEXT:NEXT:KN(1,1)=R1:KN(1,2)=R2:KN(1,3)=R3
2499 RETURN
3000 CLS:PRINT"  WELCOME TO TERMITE! TERMITE IS A GAME OF MEMORY
 AND"
3010 PRINT"(IN THE HIGHER LEVELS) TACTICS. YOU MUST HELP A TERMI
TE"
3020 PRINT"NAVIGATE A BLOCK OF PINE WOOD TO REACH A BLOCK OF CHE
RRY"
3030 PRINT"WOOD (YUMMY). THE GAME HAS 4 LEVELS OF PLAY, EACH DES
CRIBED"
3040 PRINT"BELOW. TERMITE WAS FOUNDED IN THE INTEREST OF PURE FU
N"
3050 PRINT"BUT IT HAS PROVED TO BE A TOOL FOR SHARPENING THE MEM
ORY."
3070 PRINT"TO KEEP BOTH YOUNG AND YOUNG-AT-HEART PLAYERS ENTERTA
INED,"
3080 PRINT"TERMITE HAS BOTH FINE GRAPHICS AND SOUND (THE SOUND C
OMES"
3090 PRINT"FROM THE AUXILIARY PLUG). HAPPY CHOMPING!"
3100 PRINT:PRINT"ANY KEY TO CONTINUE?"
3110 K$=INKEY$:IFK$=""THEN3110
3120 CLS:PRINTTAB(10);"GENERAL RULES FOR ALL LEVELS"
3130 PRINT:PRINT
3140 PRINT"1.  THE 'KNOTS' IN THE WOOD ARE IN ODD COLUMNS ONLY."

3150 PRINT"2.  IF THE TERMITE LANDS IN A SPACE WITH A KNOT, THE
"
3160 PRINTTAB(20);"TERMITE GOES BACK TO THE START."
3170 PRINT"3.  THERE ARE 1 TO 3 'KNOTS' IN EACH ODD COLUMN."
3180 PRINT"4.  IF THE TERMITE REACHES THE 12TH COLUMN, YOU WIN."

3190 PRINT:PRINT:PRINT"ANY KEY?"
3200 K$=INKEY$:IFK$=""THEN3200
3300 CLS:PRINT"LEVEL 1 : THE LEVEL 1 GAME IS DESIGNED TO HELP IN
PROVE"
3310 PRINT"          ANYONE'S MEMORY. IF YOUR TERMITE HITS A KNOT
 IN"
```

Program continues

DISK DRIVES

BASF Fully Reconditioned to New Unit Performance
120 Day Written Warranty

Drive (bare)	$129.95
2-Drive Pwr. Sup. w/case	69.95
1-Drive Pwr. Sup. w/case	39.95
2 Drive Cable	22.50
4-Drive Cable	33.00
Drive Tech. Manual	10.00

We also sell power supplies in kit form for more savings to you.

- The kit comes to you partially assembled
- Easy pictorial step by step instructions
- Takes less than 1 hour to assemble.
- Case included, finished in black wrinkle.

Prices for kits:

2-Drive Pwr. Sup.	49.95
1-Drive Pwr. Sup.	29.95

Visa, M.C. and C.O.D.
Call our 24 hour order number
(206) 679-4797
or send M.O., Certified Check to:

Computer Peripheral Resources (C.P.R.)
P. O. Box 834, Oak Harbor, WA 98277
add 3% for U.P.S. ground
Wash. residents add 5.9% sales tax ↙420

TRS-80™ Model 1 & 3

SYSTEM DIAGNOSTIC **$99.95**
Tests for every component of your TRS-80 Model 1 or 3: ROM, RAM, Video Display, Keyboard, Line Printer, Cassette Recorder, Disk Drives, RS-232 Interface.

SMART TERMINAL **$69.95**
Model II Version (CP/M only) ... **$79.95**
The intelligent telecommunication program. Automatic transmission and reception of data. True BREAK key. Complete character mapping, lower case. Cassette and disk files compatible with both SCRIPSIT™ and Electric Pencil™.

MONITOR #4 ..... **$49.95**
Disassembler, memory displays; move, search, modify memory; read and write machine language cassettes; object code relocator; hexadecimal arithmetic; disk file and sector input and output; RS-232 communications. (Models 1 and 3 only.)

SMALL BUSINESS ACCOUNTING
Disk version **$49.95**
Cassette version **$29.95**
Based on Dome Bookkeeping record, keeps track of income, expenditures, and payroll for small business (up to 16 employees). Cassette version does not contain payroll.

Specify Model number
Send S.A.S.E. for FREE Catalogue
Add $3.00 for postage and handling.

HOWE SOFTWARE

14 Lexington Road, New City NY 10956
(914) 634-1821 ↙175

TRS-80 is a registered trademark of Tandy Corp.

COTTAGE SOFTWARE

PACKER Machine language program that edits all or part of your Basic program to run faster, save memory or ease editing. The 5 options include UNPACK—unpacks multiple statement lines into single statements maintaining logic, inserts spaces and renumbers lines. SHORT—deletes unnecessary words, spaces and REM statements. PACK—packs lines into maximum multiple statement lines including all branches. MOVE—moves line or blocks of lines to any new location on program. On 2 cassettes for 16K, 32K, & 48K.
For TRS-80 Mod I or III Level II or Disk Basic ... $29.95

SYSTEM TAPE DUPLICATOR Copy your SYSTEM format tapes. Includes verify routines. The Model III version allows use of both 500 and 1500 baud cassettes speeds.
For TRS-80 Model I or III Level II ... $15.95

CASSETTE LABEL MAKER A mini word processor to print cassette labels on a line printer. Includes 50 peel - and - stick labels on tractor feed paper.
For TRS-80 Model I or III Level II & Printer ... $17.95

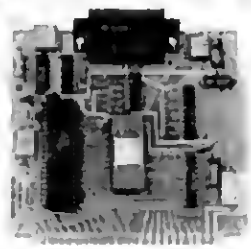
PRINT TO LPRINT TO PRINT. Edits your Basic program in seconds to change all Prints to LPrints (except Print@) or LPrints to Prints. Save edited version.
For TRS-80 Model I or III Level II ... $12.95

FAST SORT ROUTINES for use with Radio Shack's Accounts Receivable, Inventory Control I, and Disk Mailing List Systems for Model I Level II. Sorts in SECONDS. You'll be amazed at the time they can save. Supplied on data diskette with complete instructions.
FAST SORT for Accounts Receivable ... $19.95
FAST SORT for Inventory Control I ... $19.95
FAST SORT for Disk Mailing List (specify data diskette or cassette for 1 drive system ... $14.95
ALL THREE ROUTINES ... $44.95

Prices subject to change without notice. Call or write for a complete catalog. Dealer inquiries invited. VISA and Mastercharge accepted. Foreign order in US currency only. Kansas residents add 3% sales tax.
On-line catalog in Wichita FORUM 80 316-682-2113
Or call our 24 hour phone (316) 683-4511 or write
COTTAGE SOFTWARE ↙187
614 N. HARDING
WICHITA, KANSAS 67208

TRS-80™ is a trademark of Tandy Corporation

Z8 BASIC COMPUTER/CONTROLLER



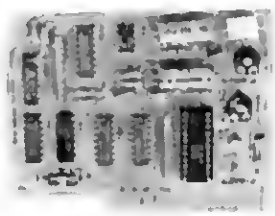
As featured in Byte Magazine, July and August 1981

- On board tiny BASIC Interpreter.
- 2 on board parallel ports.
- Serial I/O port
- 6 interrupts
- Just attach a CRT terminal and immediately write control programs in BASIC.
- BAUD RATES 110-9600 BPS
- Data and address buses available for 124K memory and I/O expansion.
- 4K RAM, 2716 or 2732 EPROM operation.
- Consumes only 1½ WATTS

Z8 Basic Microcomputer/Controller
Assembled & Tested **$195.00**
Complete Kit **$165.00**
Universal Power Supply
(+5, +12, & -12v) ..... **$ 35.00**

Z8 is a trademark of Zilog Inc.

SWEET-TALKER, IT GIVES YOUR COMPUTER AN UNLIMITED VOCABULARY.



As Featured in Byte Magazine, September 1981

- Utilizes VOTRAX SC-01A speech synthesizer chip.
- Unlimited vocabulary
- Contains 64 different phonemes which are accessed by an 8-bit code.
- Text is automatically translated into electrically synthesized speech
- Parallel port driven or Plug-in compatible with APPLE II.
- On board audio amplifier
- Sample Program for APPLE II on cassette

SWEET-TALKER
Assembled and Tested
Parallel Port Circuit Card **$139**
APPLE II Plug-in Card **$149**

VOTRAX is a trademark of Federal Screw Works

DISK-80 EXPANSION INTERFACE FOR THE TRS-80 MODEL I

As Featured in Byte Magazine, March 1981

- Disk controller (4 drives)
- Hardware data separator
- Buffered TRS bus connector
- Real-time clock
- Printer port (optional)

DISK 80-ASSEMBLED & TESTED
with 32K RAM **$329.95**
Centronics Printer
Port add ..... **$ 50.00**
DISK-80 pc board ..... **$ 48.00**
Printer/Power Supply
pc board ..... **$ 16.00**
Complete Kit with 32K
RAM and Printer Port **$275.00**

TRS-80 is trademark of Tandy Corp.

To Order: Call Toll Free 1-800-645-3479
(In N.Y. State Call: 1-516-374-6793)
For Information Call: 1-516-374-6793

MICROMINT INC.
917 Midway
Woodmere, N.Y. 11598

MICRO MINT ↙117

↙See List of Advertisers on page 338

MSS
MANAGEMENT SYSTEMS SOFTWARE

Business Programs

	16-bit Apple II/II+	8-bit Atari
Proforma Cash Budget	$125	$175
Proforma Income and Balance Sheet	125	175
Lease Purchase Decision	100	150
Business Analysis Package (12 individual programs)	100	150
Procurement	100	150

Educational Programs

College Enrollment Projection	100	150
Gradebook	50	100

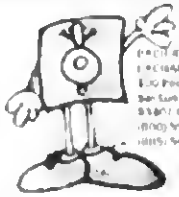
MANAGEMENT SYSTEMS SOFTWARE, INC.
2012 Bramble Lane
Tallahassee, Florida 32312
Phone (904) 386-6563
457

Scotch® Diskettes

Rely on Scotch® diskettes to keep your valuable data safe. Dependable Scotch diskettes are tested and guaranteed error-free. The low abrasivity saves your read/write heads. They're compatible with most diskette drives.

(800)235-4137

Dealer Inquiries



207

Program continued

```
3320 PRINT"          BOARD, THE BOARD IS RESET AND YOUR TERMITE G
OES"
3330 PRINT"          BACK TO THE STARTING POSITION. NONE OF THE"
3340 PRINT"          KNOTS MOVE AT THIS LEVEL."
3350 PRINT
3360 PRINT"LEVEL 2 : THE LEVEL 2 GAME IS DESIGNED TO ENTERTAIN T
HOSE"
3370 PRINT"          WHO BECOME BORED WITH THE LEVEL 1 GAME. IF Y
OUR"
3380 PRINT"          TERMITE HITS A KNOT IN THE BOARD, ALL THE KN
OTS IN"
3390 PRINT"          THE PREVIOUS ODD COLUMN MOVE 'DOWN' ONE ROW,
 WITH"
3400 PRINT"          THE BOTTOM ROW MOVING TO THE FIRST. EX: YOUR
 TERMITE"
3410 PRINT"          HAS JUST HIT A KNOT IN THE 5TH COLUMN. THE K
NOTS IN"
3420 PRINT"          COLUMN 3 (ROWS 1, 4 AND 5) WOULD BE CHANGED
TO ROWS"
3430 PRINT"          2, 5 AND 1."
3440 PRINT"ANY KEY?"
3450 K$=INKEY$:IFK$=""THEN3450
3460 CLS
3470 PRINT"LEVEL 3 : THE LEVEL 3 GAME IS A GOOD TEST FOR PATIENC
E."
3480 PRINT"          THIS LEVEL OPERATES MUCH LIKE THE LEVEL 2,"
3490 PRINT"          EXCEPT ALL THE KNOTS IN THE ODD COLUMNS MOVE
"
3500 PRINT"          DOWN WHEN A KNOT IS HIT IN ANY COLUMN."
3510 PRINT
3511 PRINT"ANY KEY?"
3512 K$=INKEY$:IFK$=""THEN3512
3513 CLS
3520 PRINT"LEVEL 4 : IF THE LEVEL 3 GAME IS A TEST OF PATIENCE,"

3530 PRINT"          THE LEVEL 4 GAME IS A TEST OF ONE'S SOUL."
3540 PRINT"          IT WOULD BE CHALLENGING FOR A CHESS MASTER"
3550 PRINT"          AND I SUGGEST THAT THE PLAYER KEEP TRACK OF"

3560 PRINT"          THE KNOTS ON A SHEET OF PAPER. THE RULES AT"

3570 PRINT"          THIS LEVEL ARE THE SAME AS LEVEL 3 WITH ONE"

3580 PRINT"          EXCEPTION, WHEN A KNOT IS HIT NOT ONLY DO"
3590 PRINT"          ALL THE KNOTS MOVE DOWN BUT ALL THE ODD"
3600 PRINT"          COLUMNS MOVE TO THE NEXT ODD COLUMN ON THE"
3610 PRINT"          RIGHT, WITH THE 11TH COLUMN MOVING TO THE"
3620 PRINT"          1ST COLUMN."
3630 PRINT
3640 PRINT"ANY KEY?"
3650 K$=INKEY$:IFK$=""THEN3650
3660 CLS
3999 RETURN
4000 REM
4100 CLS:PRINT"  CONGATULATIONS! YOU HAVE JUST WON THE LEVEL"DI"
GAME."
4105 ONDIGOTO4110,4200,4300,4400
4110 PRINT"THIS QUALIFIES YOU AS A 'JUNIOR CHOMPER.' IT TOOK YOU
"
4120 PRINTT" TURNS TO COMPLETE THE MAZE.":GOTO4990
4200 PRINT"THIS QUALIFIES YOU AS AN 'INTERMEDIATE CHOMPER.' IT T
OOK"
4210 PRINT"YOU "T" TURNS TO COMPLETE THE MAZE."
4260 GOTO4990
4300 PRINT"THIS QUALIFIES YOU AS AN 'EXPERIENCED CHOMPER.' IT TO
OK"
4310 PRINT"YOU "T" TURNS TO COMPLETE THE MAZE."
4360 GOTO4990
4400 PRINT"THIS QUALIFIES YOU AS A 'SUPER TERMITE.' IT TOOK YOU
"
4410 PRINTT" TURNS TO COMPLETE THE MAZE. GIVE YOURSELF A PAT ON"

4420 PRINT"THE BACK AND A PIECE OF SOFT WOOD TO THE TERMITE (HE'
S"
4430 PRINT"HAD A HARD DAY)."
4990 PRINT:PRINT"WOULD YOU LIKE TO TRY AGAIN?"
4991 K$=INKEY$:IFK$=""THEN4991
4992 IFK$="Y"THENGOSUB7500:GOTO11
4993 IFK$<>"N"THEN4991
4998 CLS:PRINTCHR$(23):PRINT@470,"CHICKEN!"
4999 GOTO4999
5000 FORL5=1TO5:FORL1=1TO51
5010 OUT255,1:OUT255,0
5020 FORL2=1TO52:NEXT
5030 NEXT
```

Program continues

Program continued

```
5040 FORL3=1TO3
5050 OUT255,1:OUT255,0
5060 FORL4=1TO4:NEXT
5070 NEXT
5080 NEXT
5090 RETURN
6000 Z$(1)="                              "+STRING$(12,CHR$(191))
6010 Z$(2)="                          "+STRING$(12,CHR$(191))+"          "
6015 Z$(2)=Z$(2)+STRING$(12,CHR$(191))
6020 Z$(3)="                "+STRING$(24,CHR$(191))
6030 Z$(4)="                "+STRING$(6,CNR$(191))+"
   "
6035 Z$(4)=Z$(4)+STRING$(6,CHR$(191))
6040 FORX=1TO3:FORY=1TO4:PRINTZ$(X):NEXT:NEXT
6050 PRINTZ$(4):PRINTZ$(4):PRINTZ$(4):PRINTZ$(4);
6055 PRINT@437,"TERMITE!";
6056 PRINT@498,"A MEMORY-MAZE";
6057 PRINT@567,"GAME.";
6060 FORX=1TO3000:NEXT:CLS:RETURN
6995 FORX=1TO6:FORY=1TO3:KR(X,KN(X,Y))=1:NEXT:NEXT
7000 PQ=263:FORX=1TO6:PP=PQ:FORY=1TO5
7010 IFKR(X,Y)=0PRINT@PP,"    ";:PRINT@PP+64,"    ";
7012 IFX<6PRINT@PP+4,"    ";:PRINT@PP+68,"    ";
7015 PP=PP+128
7020 NEXT:PQ=PQ+8:NEXT:FORX=1TO5000:NEXT:RETURN
7500 FORX=1TO6:FORY=1TO5:KR(X,Y)=0:NEXT:NEXT:RETURN
```


5¼" Floppy Disk Drives

TRS 80* model I & III Compatible

TANDON Model TM 100-1 **$219.95*ea.**

2 or more — $214.95 ea *

Floppy Drive Power Connector Kit $2.00*

Tandon Manual and Schematic $3.00*

12" Green Phosphor Zenith Monitor $119.95*

We also stock TM 100-2's the TM 602S 603S and the 603E Winchester Drives

CALL NOW - TOLL FREE

800-824-7888 all states except CA
800-852-7777 for CA residents
Ask for Operator #99

MC / VISA or C O D with certified check or money order Kansas residents add 3% sales tax

*Plus shipping

For info call 316-683-9225
316-685-9445

gk computer systems

923 Longfellow Street
Wichita, KS 67207 ✓425

TRS-80
COMPUTER
DISCOUNTS

- Factory Direct
- Best Prices Anywhere
- No Out-of-State Taxes
- Full Radio Shack Warranty
- Free Price List

SCOTT TASSO
Owner
Radio Shack Associate Store #7053
175 E North Delsea Drive
Vineland, N.J. 08360
800-257-0426
NJ 609-691-7100 ✓510

PRACTICAL • ORIGINAL • SINGULAR • SUPERB • UNUSUAL • USEFUL • MEANINGFUL • IMPORTANT • SIGNIFICANT • MARVELOUS • SPECIAL • IDEAL • SUPER • PRAISEWORTHY • SUPERIOR • SKILLFUL • NOTABLE • NIFTY •

REFWARE THESAURUS
INNOVATIVE INSTANT WORD-FINDER

How many times have you racked your brain for just the right word when writing an important letter, report, or article? How many times have your ideas been misunderstood because the words you used didn't express your thoughts clearly and accurately?

Now, by using the remarkable new **REFWARE THESAURUS** programs, your computer can speedily find those words that are on the tip of your tongue but that you can't quite remember at the moment. And it tells you how to spell them!

Just slip a **REFWARE THESAURUS** disk into your disk drive. Then type in your sentences or paragraphs. The computer will quickly offer a variety of alternatives, retyping your sentences or paragraphs with substitute possibilities chosen from its multi-thousand word vocabulary. It displays the revised sentences on your monitor or types them on your printer as you choose, so that you can mull them over and choose the one that most accurately expresses what you REALLY mean to say.

In addition to the specific programs capable of substituting suggested alternate words for nouns and adjectives, **REFWARE THESAURUS Builder** enables engineers, physicians, lawyers, educators, businessmen, authors, and other professionals and specialists to develop their own individually tailored vocabularies of hard-to-remember technical words.

REFWARE THESAURUS Adjectives 1.0 $39.95
6,200 adjectives assist you in choosing the most accurate modifiers in your ads, letters, reports, and speeches.

REFWARE THESAURUS Nouns 1.0 $39.95
6,200 nouns suggest alternates for the names of persons, places, things, and ideas that you use in your writing and speaking.

REFWARE THESAURUS Builder 1.0 $149.95
Series of eight utility programs enables the user to develop specialized computer thesaurus disk programs of hard-to-remember technical words and their alternates for personal use. Functions independently of Adjectives and Nouns programs.

MINIMUM System Required TRS 80* Mod I or Mod III 48K with two disk drives
* A Trademark of Tandy Corporation

REFWARE* Reference software division David C. Whitney Associates, Inc
P.O. Box 451, Chappaqua, N.Y. 10514
* ® trademark of David C. Whitney Associates, Inc ✓114

• INVALUABLE • SKILLFUL • REMARKABLE • PRAISEWORTHY •

AMWAY

PRODUCT DISTRIBUTOR PROGRAMS

- TRS-80 MODEL I/III 16K CASSETTE-BASED
- DISKS NOT REQ'D • SPECIFY MODEL I OR III
- BASIC LISTINGS AVAILABLE FOR OTHER COMPUTERS
- WRITTEN BY EMERALD DIRECT FOR HIS OWN USE

14 PROGRAMS ON 3 CASSETTES!

#1 **AMWAY PRODUCT DISTRIBUTOR PAK $50**
7 PROGRAMS, including Order Verification (40 products in memory), Distributor Records, Gross Profit, Bookkeeping, Printer Optional

#2 **MONTHLY BONUS RECORD PROGRAM $20**
PV/BV from all sources with remarks. Does ALL calculations. Printer required.

#3 **SMALL HOME BUSINESS PAK $95.95**
6 PROGRAMS, including Word Processor, Ledger, Mailing List, Telephone Dialer Timer, Simple Invoice. Printer required.

#4 **AMBIZ PAK** (#1 above, #3 00 saves $19.85)

16-sheet INFO-PAK Send $2 (credit on order)
All prices postpaid USA, Canada. Foreign add $2. CA add 6%

BLECHMAN ENTERPRISES
7217 Bernadine Ave.
Canoga Park, CA 91307
Phone: (213) 346-7024

MasterCard VISA

PROFESSIONAL-GRADE SOFTWARE

TRS-80 MODEL I

CATALOG 48K, 1 Disk
Indexes disks and files of any type or system. Very fast, 2500 file capacity, single and double density.
$69.50

EP-GRAPHICS 48K, 1 Disk
Epson 80 with GRAFTRAX, or 100 becomes printer/plotter. 512 x 512 or 480 resolution fills page. Machine language major software, call from short BASIC program.
$79.50

TRS-80 MODELS I/III

TUMBLE 48K, 1 Disk
Control spin, speeds and tilts of moving 3-D geometric shapes. Real-time, fast screen displays teach and entertain.
$39.50

GANTT-PACK 48K, 2 Disk
Projected, elapsed and over-run project schedules charted on screen/132 column printer. Random entry, automatic organization, fast update/edit. Play "*what if...*"
$149.50

TRS-80 MODEL II

STAT-TO-PLOTTER 64K, 1 Disk
Program merges into R.S. Statistical Analysis package. Puts statistical work directly to R.S. plotter or other HI-PLOT 3-7. Publication quality charts.
$99.50

FILE CARD 64K, 1 Disk
Look up records by powerful database and immediately see/print the text. Infinitely long text area for any entry. Replaces file card system.
$224.50

GANTT-PACK 64K, 2 Disk
Enhanced version, early and late entries, expanded capacity.
$224.50

LIBRA LABORATORIES
495 MAIN STREET
METUCHEN, NEW JERSEY 08840
(201) 494-2224 ✓131

TRS-80 Trademark of Tandy Corporation
HI-PLOT Trademark of Houston Instruments
Epson Trademark of Shinshu Seiki Co., Ltd.
Libra Laboratories' programs copyright 1981, 1982.

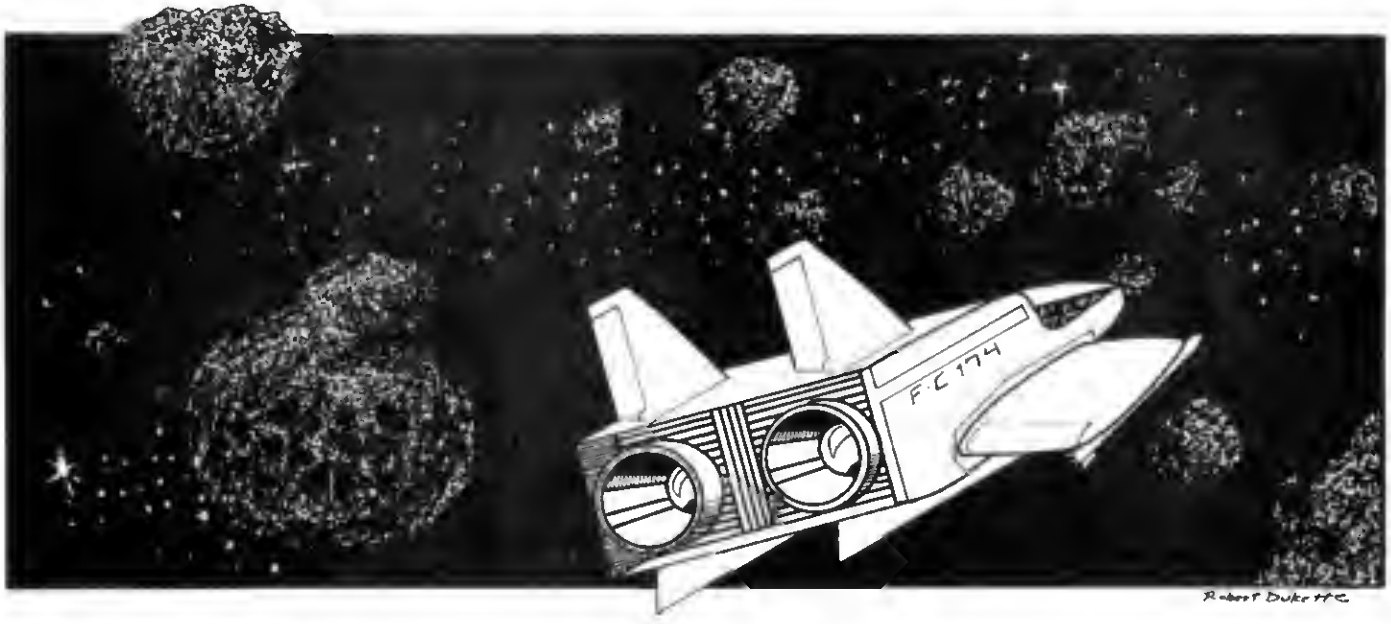
✓See List of Advertisers on page 338

GAME

LOAD 80

Pick your way through the asteroids or become cosmic debris.

Thru the Asteriods




```
 REM*************************************************************
*************
2 S=PEEK(16548)+256*PEEK(16549)+5
3 FOR J=1 TO 72
4 READ X
5 POKE S+J-1,X
6 NEXT J
7 DATA 205,127,10,203,124,40,4,34,28,65,201,34,30,65
8 DATA 219,255,31,31,31,47,230,240,95,58,57,65,254,4,32,2
9 DATA 171,95,58,32,65,87,237,75,28,65,43,124,181,40,6
10 DATA 221,227,221,227,24,12,42,30,65,122,7,7,87,230,3,179
11 DATA 211,255,3,120,177,32,220,123,211,255,201
```

Program Listing 1

Program Listing 2. The first line of this program contains a REM statement with packed machine code. Because of this, keying in this program requires a preliminary step to pack the machine code into line 1. To pack the machine code into line 1, key in and run Listing 1. Next, delete lines 2–11, leaving only line 1. (Line 1 when listed will cause the video screen to behave strangely.) Program Listing 2 may then be keyed in as normal.

```
1 REM ** USE PROGRAM LISTING 1 TO GENERATE PACKED MACHINE CODE I
N LINE 1.  THEN KEY IN THE REST OF THIS LISTING **
2 DEFINTA-Z:RANDOM:DIM V(9):S=256*PEEK(16549)+PEEK(16548)+5
10 DEFINTA-Z:S=256*PEEK(16549)+PEEK(16548)+5:CLS:PRINT:S1=S/256:
S2=S-(S1*256):POKE16527,S1:POKE16526,S2:POKE16672,5:GOSUB700
20 PRINT"YOU ARE THE PILOT OF A HYPERLIGHT CORSAIR ON A ROUTINE
MISSION";GOSUB700:GOSUB700:GOSUB700
30 PRINT"TO A REMOTE PLANET ON THE EDGE OF THE GALAXY.  ALL APPE
ARS";GOSUB700:GOSUB700:GOSUB700
40 PRINT"NORMAL AS YOUR STARLIKE DESTINATION BEGINS TO RAPIDLY W
IDEN";GOSUB700:GOSUB700:GOSUB700
50 PRINT"INTO AN ENLARGING DISK, WHEN, TO YOUR HORROR AN UNCHART
ED";GOSUB710
60 PRINT"ASTEROID FIELD SUDDENLY APPEARS THROUGH YOUR COCKPIT WI
NDOW.";GOSUB710:GOSUB710:PRINT
```

Program continues

Joe D. Fugate
8979 Mandan Court
Boise, ID 83709

The October 1980 issue of *80 Micro* included a great little game, Asteroid Adventure, by Greg Perry and Richard Taylor. Their format was so simple I couldn't resist doing a little tinkering.

I call my version Thru the Asteroids. It is a real-time program with sound. I also included a performance rating routine based on the number of successful trips made through the asteroid field versus the number of crashes.

To start the game choose an experience level (zero to nine, with zero as beginner). The experience level determines the rate at which the game proceeds and the density of the asteroid field.

Little rewards await the player for each successful traversing of the asteroid field. After three successes the player is upgraded to the next experience level. A special reward is displayed for the player who successfully maneuvers through a level nine asteroid field.

Adding Sound

I tried several machine language subroutines from back issues of *80 Micro* for a good explosion sound and found Sound X in the July 1980 issue.

I think you will find Thru the Asteroids to be an addicting little game. ■

Joe Fugate, a programmer analyst, enjoys building models, science-fiction games, and fiddling with his micro.

The Key Box

Model I or III
16K RAM
Cassette Basic

Program continued

```
70 PRINT"ITS TOO LATE TO AVOID IT,..YOU TAKE A DEEP BREATH...GRI
P";GOSUB720
80 PRINT"YOUR CONTROL STICK TIGHTLY...BECAUSE YOU ARE GOING--":G
OSUB720
90 GOSUB630
100 PRINT"
THE UP AND DOWN ARROW KEYS WILL MANEUVER"
110 PRINT"YOUR CORSAIR AROUND THE ASTEROIDS.

  PRESS ENTER TO BEGIN."
115 A$=INKEY$:IF A$="" THEN GOTO 115
116 IF ASC(A$)<>13 GOTO 115
120 A=USR(-3000):A=USR(30):X=15872:I=0:CLS:GOSUB390:GOSUB430:POK
EX+1,32:POKEX,62:FORN=1TO250:NEXTW:A=USR(30):POKEX,32:POKE16672,
5
190 LETY=PEEK(14400):IFY=0THENLETX=X-65:IFX<15360THENLETX=X+65:G
OTO250
200 IFY=16THENLETX=X+63:IFX>16317THENLETX=X-63:GOTO250
230 LETX=X+1:IFPEEK(X)<>32GOTO310
250 POKEX,62:POKEZ,32:LETZ=X:FORW=1TOE:NEXT
310 IFPEEK(X)=42GOTO530ELSEIFPEEK(X)>128GOTO550ELSEGOTO190
390 CR=15360
395 IF E>8 THEN NN=30
396 IF E<9 NN=20
397 IF E<4 NN=15
398 IF EL=9 NN=12
400 R=RND(NN)+2:CR=CR+R:IFCR>16379RETURNELSEPOKECR,42:GOTO480
430 W=63:FORI=1TO8:PRINT@W,STRING$(I,CHR$(191));:W=W+63:NEXT:W=W
+1:FORI=8TO2STEP-1:PRINT@W,STRING$(I,CHR$(191));:W=W+65:NEXT
510 FORY=45TO47:FORN=126TO127:SET(N,Y):NEXTW,Y:RETURN
530 CR=1:POKE16672,6:POKEX,191:POKEX+1,140:POKEX-1,140:POKEX-64,
176:POKEX+64,131:A=USR(-190):A=USR(15):A=USR(-2000):A=USR(90)
540 POKEX,166:POKEX+1,136:POKEX-1,132:POKEX-64,164:POKEX+64,137:
A=USR(-900):A=USR(100):A=USR(-1000):A=USR(300):A=USR(-100):A=USR
(200)
545 POKEX,132:POKEX+1,128:POKEX-1,128:POKEX-64,128:POKEX+64,128:
A=USR(-1000):A=USR(200):POKEX,128:A=USR(-5000):A=USR(290):CLS:CC
=CC+1:GOTO690
550 CR=0:CLS:PRINTCNR$(23):FORI=1TO5:PRINT@256,"SUCCESSFUL LANDI
NG":A=USR(8000):A=USR(50):PRINT@192,"
":FORJ=1TO100:NEXTJ,I
560 PRINT@272,CHR$(30):FOR P1=1 TO 5#:NEXT:CLS:LL=LL+1:GOTO690
630 CLS:PRINTCHR$(23):PRINT@448,"    THRU THE ASTEROIDS"
640 FORI=80TO20STEP-1:A=USR(-200):A=USR(I):NEXTI:FORI=19TO1STEP-
1:A=USR(-500):A=USR(I):NEXTI
650 CLS:PRINT:PRINT"(C)1981 BY JOE D. FUGATE":PRINT:PRINT:PRINT
"WHAT IS YOUR EXPERIENCE LEVEL?"
660 PRINT"<1:NOVICE TO 9:ACE>";
665 E$=INKEY$:IF E$=""GOTO665
666 A=USR(-3000):A=USR(30):EL=ASC(E$)-48:PRINT EL:E=10-EL
670 IF E<1 OR E>10 THEN CLS:PRINT:PRINT:GOTO 660
680 RETURN
690 GOSUB800:A=USR(-3000):A=USR(25):GOTO120
700 FORI=1TO5:A=USR(-3000):A=USR(80):FORJ=1TO30:NEXTJ,I:RETURN
710 FORI=1TO10:A=USR(-2000):A=USR(10):A=USR(-3000):A=USR(80):FOR
J=1TO30:NEXTJ,I:RETURN
720 FORI=1TO10:FORJ=1TO20:A=USR(-100):A=USR(J):NEXTJ,I:RETURN
800 CLS:A=USR(-3000):A=USR(30):PRINT"
LEVEL ";EL;:IFCC=0THENCR=1ELSECR=CC
801 IFCR=0THENSC%=SC%+(LL/CR*100)*EL
802 PRINT"
RATING ";SC%;"

  LANDINGS-----> ";LL;"
  CRASHES------> ";CC
805 FORI=1TO1000:NEXTI
810 IFLL=0AND(CC=3ORCC=6ORCC=9ORCC=12ORCC>15)PRINT"
WHY DON'T YOU JUST GIVE UP AND COME BACK LATER?":FORI=1TO200:NEX
TI
820 IFLL<3GOTO890ELSEPRINT"
3 SUCCESSFUL LANDINGS AT THIS LEVEL!!";FORI=1TOEL:A=USR(-2000):A
=USR(20):A=USR(15):A=USR(20):A=USR(-5500):A=USR(15):NEXTI:EL=EL+
1:E=E-1:IFEL<10PRINT"
UPGRADING TO LEVEL ";EL:LL=0:CC=0:SC%=0
829 IFEL=10THENR=15360:SW=-1:CLS:PRINTCNR$(23):PRINT@466,"H O O
O R A Y!":GOTO838
830 POKE16772,182:A=USR(-10000):A=USR(20):A=USR(13):A=USR(-3000)
:FORI=1TO2:A=USR(15):A=USR(-1000):A=USR(16):A=USR(-3000):A=USR(1
8):A=USR(-10000):A=USR(10):A=USR(13):A=USR(-3000):NEXTI:A=USR(-3
000):A=USR(15):A=USR(16):A=USR(15):A=USR(-30000):A=USR(18)
831 RETURN
838 C1=22:GOSUB848:C1=18:GOSUB848:C1=15:GOSUB848:C1=12:GOSUB845:
C1=10:GOSUB845:A=USR(9):FORI=1TO100:NEXTI:FORK=1TO2:GOSUB830:NEX
TK:A=USR(-500):CLS
839 IFCC<10PRINT"
          YOU HAVE BEEN AWARDED--
   THE HIGHEST HONORS BESTOWED A HYPERLIGHT CORSAIR PILOT...

          ......GALACTIC MASTER HYPERLIGHT PILOT !!":FORI=4#TO1
STEP-1:A=USR(I):NEXTI:ENDELSEEND
840 A=USR(-10000):GOSUB900:A=USR(C1):GOSUB900:A=USR(-2700):GOSUB
900:A=USR(C1):GOSUB900:A=USR(C1):GOSUB900:A=USR(-10000):GOSUB900
:A=USR(C1):GOSUB900:A=USR(-2700):GOSDB900:A=USR(C1):GOSUB900:A=U
SR(C1):GOSUB900:A=USR(-6000):GOSUB900:A=USR(C1)
841 GOSUB900:A=USR(-8000):GOSUB900:A=USR(C1):GOSUB900:A=USR(C1):
GOSUB900:A=USR(-2700):A=USR(C1):A=A:A=USR(C1):A=A:A=USR(C1):RETU
RN
845 GOSUB900:A=USR(-22000):GOSUB900:A=USR(C1):GOSUB900:A=USR(-27
00):GOSUB900:A=USR(C1):GOSUB900:A=USR(C1):GOSUB900:A=USR(C1):GOS
UB900:RETURN
899 FORI=1TO500:NEXTI:RETURN
900 OUT255,0:SW=SW*-1:R=15360+RND(1000):POKER,48:S=15360+(RND(50
0)*2):POKES,49:IFSW>0PRINT@466,"H O O O R A Y !";:OUT255,15:RETU
RN
910 PRINT@466,"                ";:OUT255,15:RETURN
```

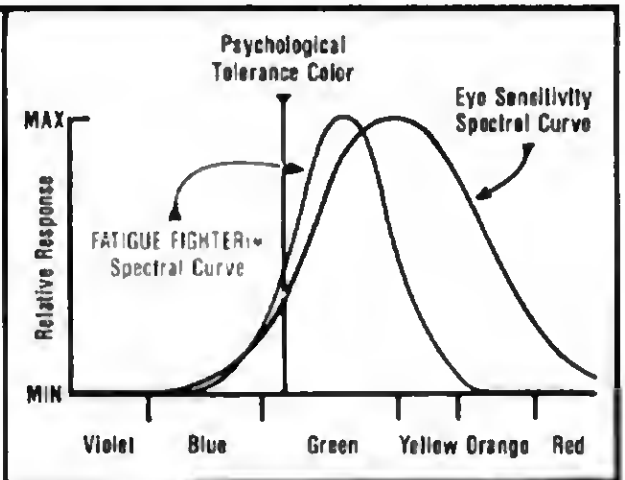

—ATTENTION ALL TRS-80* OWNERS—

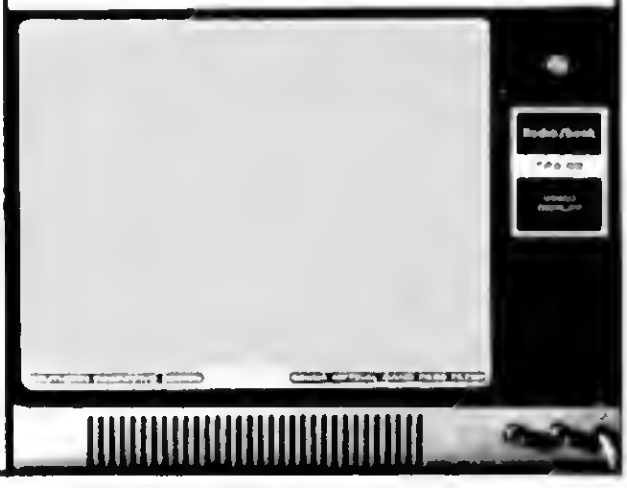
No matter how your Model I, II, or III is used, whether it be business or pleasure, this product can benefit you

The **FATIGUE FIGHTER**™ reduces the operator fatigue (irritated, watery eyes and headaches) caused by the harsh white video display thereby making computer use more efficient and/or enjoyable. The graph at the right will help explain how it works. Superimposed on the standard eye sensitivity curve is the band pass curve of the **FATIGUE FIGHTER**™ as recorded by a spectrophotometer. A marker is also on the graph at the ideal psychological tolerance color. As you can see, the green color of the **FATIGUE FIGHTER**™ takes advantage of both eye sensitivity and psychological tolerance to make the display less irritating.

The **FATIGUE FIGHTER**™ is made of tough ⅛ inch thick acrylic sheet which adds absolutely no distortion or fuzziness to the display and is industry proven to be an excellent material for optical filtering (e.g. lenses for laser safety goggles). It installs easily on all three TRS 80* models with a pressure sensitive adhesive which will not let the filter fall off yet allows easy removal if necessary. Finally, the black and silver border design makes it a perfect match for the computer styling.

If you want a **FATIGUE FIGHTER**™ of your own but prefer not to order by mail, check with your local computer stores to see if they have them in stock. Otherwise follow the ordering instructions below.





TO ORDER: Send Name & Address Typed or Clearly Printed with Check or Money Order (U.S. FUNDS) for $14.95 Each, Including Shipping. Canadian Orders add $1.00 Each. All Other Foreign Orders Add $2.00 Each for Shipping. NO CREDIT CARD ORDERS. COD's (U.S. ORDERS ONLY) are $2.50 Additional Per Order & are Accepted by Mail or by Calling 904-378-2484 8-5 M-F. Florida Residents Add 5% Sales Tax.

*TRS 80 IS A TANDY CORP. TRADEMARK

ALL MAIL ORDERS MUST BE SENT TO THE U.S. ADDRESS

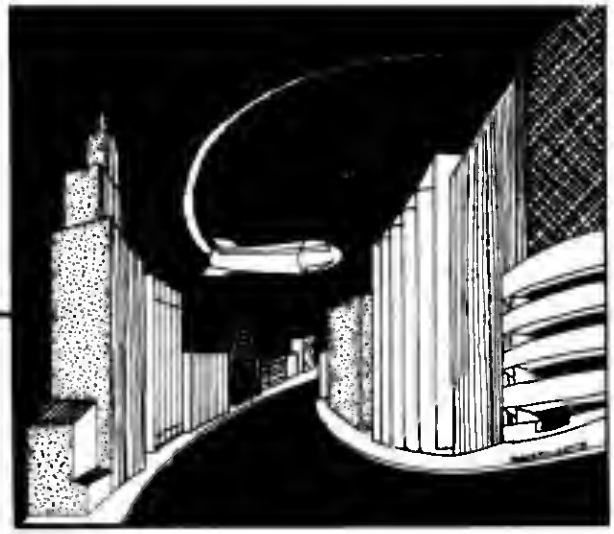
SID

SOUTHERN INNOVATIVE DESIGN
1520 NORTHEAST 12TH STREET
GAINESVILLE, FLORIDA 32601 ✓35

DEALER INQUIRIES INVITED

CANADIAN DEALERS ONLY— For pricing and ordering information contact: MICRO-COMP ENTERPRISES, 955 Brock Rd. S., Unit 3, Pickering, Ont. L1W 2X8 Phone 416-839-4581

✓See List of Advertisers on page 338



The cities' survival is up to you.

Alien Attack

Larry F. Perry
920 Baldwin Street
Denton, TX 76210

Do you like adventure and fast action? Well, here's another one of those space games.

How to Play

Begin by selecting the level at which you wish to play. A blinking cursor shows the position of your right joystick on the screen. Your bunker is at the bottom, and the cities you must protect are to the left and right of your bunker. Three missile trails will come down the screen. Using the joystick, put the cursor as near as you can to the front of the missile trail, and push the firing button to destroy the missile. You normally get 10 points for each missile destroyed, but extra points are added for some hits.

After you manage to get 300 points, the game speeds up. After reaching 500 points, look out for an alien. You must hit the alien in the orange spot to destroy it. If you succeed, you are given 100 extra points, and any destroyed cities are rebuilt. (Your cities will only be rebuilt twice.) If all of your cities are destroyed, the game ends.

How it Works

Line 480 checks the score to see if aliens can appear. S2 is the hundreds column in your score, and S3 the thousands. VX is a random number—whenever it equals 50, an alien attacks. You can change the number to which S2 is compared to eny number between zero and nine (right now it is four). You can also change the size of the random number selection to change the probability of an alien attack.

Eliminate lines 1550-1570 if you don't want the game to speed up automatically. In line 1690, LC equals the number ot times your cities will normally be replaced. You can increase or decrease this to any number.

In the firing sequence you can speed up the explosion by using the Draw command. I chose the Circle command to give the player a slight breather. One interesting note: In lines 690-710 I used the variable CO to set the explosion's color.

The Key Box

Extended Color Basic
Color Computer
16K RAM

Program Listing

```
10 REM  INTRODUCTION
20 GOSUB1860
30 CLS:PMODE1,1:PCLS
40 CLEAR700
50 REM SOUND FOR GAME
60 P1$="V30L2503ABABL10O4CL25O4DEL10DADA":P2$="V10L25O4AC":P3$=
"V10L25O3ABCABCABCABC":P4$="V30L15O1FA":P5$="V15L15O1FA":P6$=
P5$:P7$="V30O3L35BDEBDEBDEBDEBDEL5OABABABABABAB"
70 P8$="V30O3L10OPGACPGACPGACPGACPGACPGACPGACPGACPGACPGAC
80 REM GAME CHOICES
90 PRINT"WHAT LEVEL DO YOU WISH TO PLAY?":PRINT" 1) NOVICE
                2) SEMI-PRO                    3) PRO
                4) MASOCHIST
100 PRINT"ENTER 1, 2, 3, OR 4
110 LC=0
120 PRINT" TO GET OUT OF THE GAME PRESS   <O>. NOTE: THE GAME IS
 OVER WHENALL OF YOUR CITIES ARE GONE,    BUNKER PENETRATION, OR
 YOU GIVE UP. THE OBJECT IS TO GET AS MANYPOINTS AS YOU CAN. THE
 NISSILES NEVER STOP COMING.
130 PO$=INKEY$:IFPO$=""THEN130
140 REM  SET SPEED OF GAME AND SOUND FOR MISSILE ADVANCE
150 IFPO$="1" THEN P5$=P2$:L1=2:L2=1:GOTO210
160 IFPO$="2" THEN L1=4:L2=2:GOTO210
170 IFPO$="3"THEN L1=6:L2=3:GOTO210
180 IFPO$="4"THEN L1=8:L2=4:GOTO210
190 GOTO130
200 REM  FIRST ATTACK POSITIONS
210 BB=24:CC=156:DU=94
220 COLOR2,1
230 REM  FIRST ANGLE OF ATTACK
240 C=2:G=-1:J=-1
250 REM  START LINES 15 SPACES DOWN FROM TOP OF SCREEN
260 BA=15:CA=15:DA=15
270 REM  SET UP START SCORE
280 GOSUB1130:GOSUB1160
290 COLOR2,1:GOSUB320
300 GOTO450
310 REM  DRAW CITIES & BUNKER
320 COLOR 2,1:LINE(0,186)-(256,191),PSET,BF
330 LINE(105,181)-(147,186),PSET,BF
340 LINE(110,176)-(142,181),PSET,BF:LINE(115,171)-(137,176),PSET
,BF:LINE(120,166)-(132,171),PSET,BF
350 AA$="L3U5R2U5R2U8R2U3R3D3R2D8R2D5R2D5L15"
360 FOR UU=14TO74STEP30
370 DRAW"C4;BM"+STR$(UU)+",184;"+AA$
380 PAINT(UU+5,180),4
390 NEXTUU
400 FOR UU=234TO164STEP-30
410 DRAW"C4;BM"+STR$(UU)+",184;"+AA$
420 PAINT(UU+5,180),4
430 NEXT UU
440 RETURN
450 COLOR4,1:SCREEN1,1
460 REM  BASIC GAME LOOP
470 AA=JOYSTK(0)*4:AB=JOYSTK(1)*4:GO$=INKEY$:IFOO$="O"THEN1730
480 IFS2>4OR S3>0THEN C=C:VX=RND(100):IFVX=50THEN2050
490 IFBA+D>190OR CA+F>190OR DA+I>190GOTO1960
500 Q=PPOINT(BB+B+2,BA+D+2):R=PPOINT(CC+E+2,CA+F+2):S=PPOINT(DU+
B+2,DA+I+2)
510 IFAB>150THEN AB=150
520 IFAB<20THEN AB=20
530 IFD>14STHEN C=C:IFO=BOR Q=6THEN GOSUB930
540 IFF>14STHEN C=C:IFR=BOR R=6THEN GOSUB1000
550 IFI>14STHEN C=C:IFS=BOR S=6THEN GOSUB1060
560 REM  INCREMENT LINE POSITIONS AND DISPLAY
570 D=D+L1:B=B+C*L2:F=F+L1:E=E+C*L2:I=I+L1:H=H+J*L2
580 LINE(AA,AB)-(AA+5,AB+1),PSET,B:COLOR4,1:LINE(BB,BA)-(BB+B,BA
+D),PSET:COLOR3,1:LINE(CC,CA)-(CC+E,CA+F),PSET:COLOR2,1:LINE(DD,
DA)-(DD+B,DA+I),PSET:COLOR4,1:LINE(AA,AB)-(AA+5,AB+1),PRESET
590 REM  CHECK FIRE BUTTON
600 POKE65494,0:PLAY P5$:P=PEEK(65280):POKE65495,0:IFP=126OR P=2
54THEN640
610 GOTO 470
620 REM  END OF BASIC GAME LOOP
630 REM LASER FIRE ROUTINE
640 G1=PPOINT(AA+2,AB-1):G2=PPOINT(AA+2,AB-2):G3=PPOINT(AA+1,AB-
1):G4=PPOINT(AA+1,AB-2):G5=PPOINT(AA+3,AB-1):G6=PPOINT(AA+3,AB-2
):G7=PPOINT(AA,AB-1):G8=PPOINT(AA+4,AB-1)
650 LINE(126,164)-(AA+2,AB),PSET
660 POKE65494,0:PLAY P3$;POKE65495,0
670 LINE(126,164)-(AA+2,AB),PRESET
680 CO=6
690 IFG1=8OR G2=8OR G3=8OR G4=8OR G5=8OR G6=8OR G7=8OR G8=8THENC
O=8:K1=1:GOTO730
700 IFG1=7OR G2=7OR G3=7OR G4=7OR G5=7OR G6=7OR G7=7OR G8=7THENC
```

Listing continues

Price

That's the only difference between the computers and accessories you can buy from Computer Discount of America, Inc. and the ones you can buy elsewhere.

In fact we will meet or beat any price you can find from an authorized Radio Shack Dealer.

Selection

We have the largest inventory in the Northeast of:

Computers	Printers	Monitors	Diskettes	Software
TRS-80	Microline	Zenith	Maxell	Micropro
Atari	Epson	NEC	Wabash	Broderbund
Apple	C. Itoh	Amdek	3M	Sirius
Commodore		BMC		Visicorp
Panasonic				

and the most complete line of accessories, ready to ship.

Service

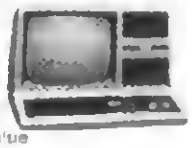
We ship all orders from stock within 24-48 hours. All items are in factory sealed cartons, and are pure factory built and tested. No untested memory chips from us. And, we will replace any merchandise that arrives initially defective or damaged.

So, if you're looking for the best prices, selection, and service, in the U.S.A., check the others but call Computer Discount of America, Inc.

Send for FREE 40-page catalog including equipment reviews, prices, specs, and illustrations on over 500 computers and accessories.

TRS-80® Model II
by Radio Shack
Reg $3499.00
$3019
64K Pure Radio Shack Factory Built and Tested
Offer expires 8/31/82

TRS-80® Model III
by Radio Shack
Reg. $999.00
$815
Includes a Free Green Screen Insert, A $22.95 Value
Offer expires 8/31/82



ATARI 800 Home Computer
with 48K of RAM
Reg. $1097
$779
Complete with 10K ROM and 48K RAM. All owner manuals, BASIC Cartridge, and RF Modulator included. Offer expires 8/31/82

EPSON MX80FT
Reg. $745.00
$539
Includes Graftrax and A Free package of 500 Sheets of Computer paper A $10.95 Value
Offer expires 8/31/82

Okidata Microline 84
Reg. $1395.00
NEW!
$1049
200 CPS
Offer expires 8/31/82

CALL TOLL FREE: 800-526-5313
Computer Discount of America, Inc.
15 Marshall Hill Road, West Milford Mall
West Milford, New Jersey, 07480-2198
In New Jersey call: 201-728-8080

Computer Discount of America

The explosion for the cities and bunker, starting at line 930, can also be changed to the Draw command. Using the Draw command along with the Size command, you can simulate a growing mushroom cloud. (When you are stuck with Basic, the simpler the task, the faster it can be done.)

The animation in the alien attack loop (lines 2140–2270) was accomplished using three variables—one for the main body of the alien, the other two used alternately to simulate flapping wings and moving legs or arms. This neat little task is accomplished using two lines (2180 and 2190). These lines switch the variables back and forth while the loop is running. If you want more advanced animation, you could draw several figures and use the Get and Put statements for animation sequences.

One of the reasons this game executes rapidly is that I increased the speed of the microprocessor by POKEing a zero into the address 65495. Those of you with early TRS-80 models may be unable to do this. To test your computer, POKE 65495,0. If the cursor flashes twice as fast as normal, your computer will operate at the higher speed. If your computer locks up, or nothing appears to happen, take out the command.

You will notice the statement POKE 65494,0 in several places. This brings the computer back to its normal speed while reading the joysticks and during sound routines. If it is not there while reading a joystick the computer will improperly perceive the joystick fire button. If the computer is in the fast mode while executing sound, it will occasionally lock up. Not all components of the computer are capable of a doubled response time.

Good luck—you'll need it!■

Larry Perry's interests include astronomy, electronics and motorcycles as well as his Color Computer.

Listing continued

```
70 I=7:X2=1:GOTO730
710 IFG1=6OR G2=6OR G3=6OR G4=6OR G5=6OR G6=6OR G7=6OR G8=6THENC
O=6:X3=1:GOTO730
720 GOTO470
730 FORK=1TO6:CIRCLE(AA+2,AB+2),X,CO:NEXTX
740 FORK=6TOISTEP-I:CIRCLE(AA+2,AB+2),X,1:NEXYX
750 IF RB>5+D THEN BA=15:IFK1=1THEN K1=0:LINE(BB,RA)-(BB+B,BA+D)
,PRESET:D=0:B=0:C=0:READ BB,C:GOSUB840:GOTO470
760 IF RB>5+F THEN CA=15:IFK2=1THEN K2=0:LINE(CC,CA)-(CC+E,CA+F)
,PRESET:F=0:E=0:G=0:READ CC,G:GOSUB840:GOTO470
770 IF AB>5+I THEN DA=15:IFK3=1THEN K3=0:LINE(DD,DA)-(DD+B,DA+I)
,PRESET:B=0:I=0:J=0:READ DD,J:GOSUB840:GOTO470
780 K1=0:K2=0:K3=0:GOTO470
790 RR=RR+1
800 IFRR=35THEN RESTORE:RR=0
810 GOSUB1600
820 RETURN
830 REM  ADD EXTRA POINTS TO SCORE IF PERFECT HIT
840 RR=RR+1
850 IFRR=35THEN RESTORE:RR=0
860 POKE65494,0:IFG1=8THEN PLAY P8$:POKE65495,0:GOSUB1400:GOSUB1
400:GOSUB1400:GOSUB1600
870 IFG1=7THEN PLAY P7$:POKE65495,0:GOSUB1600
880 POKE65495,0:GOSUB1600
890 RETURN
900 REM  POSITIONS/ANGLES OF MISSILES
910 DATA 281,-2,131,1,161,1,94,-1,53,2,79,0,49,0,161,1,131,1,284
,0,24,2,124,-1,94,-1,156,-1,234,0,94,-1,124,-1,230,-2,161,1,53,2
,174,0,19,0,230,-2,161,1,99,1,281,-2,94,-1,161,1,79,0,174,0,131,
1,24,2,124,-1,284,0,19,0
920 REM  BLOW UP CITY/BUNKER
930 LINE(BB,BA)-(BB+B,BA+D),PRESET
940 FORKY=1TO16:CIRCLE(BB+B+2,BA+D+8),KY,4:POKE65496,0:PLAY P4$:
POKE65495,0:NEXTKY
950 FORTX=16TOISTEP-1:CIRCLE(BB+B+2,BA+D+8),TX,1:NEXTYX
960 REM RESET LINE/GET NEW COORDINATE
970 B=0:D=0:C=0:READ BB,C
980 GOSUB790
990 RETURN
1000 LINE(CC,CA)-(CC+E,CA+F),PRESET
1010 FORKY=1TO16:CIRCLE(CC+E+2,CA+F+8),KY,4:PLAY P4$:NEXTKY
1020 FORTX=16TOISTEP-1:CIRCLE(CC+E+2,CA+F+8),TX,1:NEXTYX
1030 E=0:F=0:G=0:READ CC,G
1040 GOSUB790
1050 RETURN
1060 LINE(DD,DA)-(DD+B,DA+I),PRESET
1070 FORKY=1TO16:CIRCLE(DD+B+2,DA+I+8),KY,4:PLAY P4$:NEXTKY
1080 FORTX=16TOISTEP-1:CIRCLE(DD+B+2,DA+I+8),YX,1:NEXTYX
1090 B=0:I=0:READ DD,J
1100 GOSUB790
1110 RETURN
```

Listing continues

Holmes Engineering **expanding microcomputing horizons for TRS-80® Model I/III and PMC®-80/81**

MORE THAN AN EXPANSION INTERFACE!

EXPAND your computer with the **HOLMES** expansion mainframe and one or more plug-in modules.

- Mainframe includes case, power supply, connectors (2 mainframe styles available).

- Single/Double density disc module
  - State-of-the-art LSI data separator
  - 5" & 8" drives, single and double density (optional)
  - Compatible with standard hardware & software

- 80 Column Video Module
  - 80 character x 16 lines for TRS-80® monitor
  - 80 character x 25 lines for standard monitor
  - 80 x 25 mode supports Model II video functions
  - Software/patches for many popular programs

- RS-232 / Modem Module
  - Software compatible with RS systems
  - Supports standard operating modes

- Other modules are being developed.
  - A single-module case is available to support only ONE module.
  - Due to the number of options available, please call or write for prices.

SPEED UP YOUR COMPUTER and add a printer

The **SPRINTER II**™ plugs into the Z-80 socket in your computer case with no soldering.

- Select "NORMAL" or 4 MHz operation via the "OUT 254" software command (or add a switch for hardware control)
- Automatic slowdown for disc & I/O operations
- Wait function allows use with slow ROM's.
- Includes *FAST* Z-80B MP.
- For $24.50 we'll install a standard parallel printer port on your Sprinter II.™

SPRINTER II™ $99.50
printer option $24.50
printer cable $19.50

48 K Memory INSIDE your Keyboard

IM-2™

The INTERNAL MEMORY™ plugs *inside* your computer to give you 48k of reliable memory.

- simple installation
- easily removed
- guaranteed 4 MHz operation
- extremely reliable
- compatible
- thousands in use throughout the world!

IM-1 (32k) ..... $86.00 (66.00 less RAM)
IM-2 (48k) ..... $139.50 (99.50 less RAM)

See reviews of the INTERNAL MEMORY™ in 80 Microcomputing * (Dec. '81) and 80 US Journal (March '82)

All products are completely assembled and tested and come with a one-year warranty and a 30-day "no questions asked" return privilege.
Please add $3.00 shipping in U.S. & Canada; all others add 15% shipping & handling

3555 South 3200 West Salt Lake City, Utah 84119 (801) 967-2324

master charge VISA

Dealer Inquiries Invited prices subject to change without notice. ↵153 **Send S.A.S.E. for more information**

Listing continued

```
1120 REM  ZERO FOR SCORE
1130 BB$="BU2U8E2R3F2D6G2L3BR14
1140 RETURN
1150 REM  SET SCORE VARIABLES TO ZERO
1160 CC$=BB$:GO$=BB$:KE$=BB$:HH$=BB$
1170 REM  PUT SCORE ON SCREEN
1180 LINE(180,8)-(175,10),PRESET,BF:DRAW"C3;BM165,18;"+HH$+CC$+D
D$+EE$
1190 RETURN
1200 REM  NUMBERR FOR SCORE
1210 FF$="BR1NU18BR11
1220 RETURN
1230 FF$="BU8E2R3F2D2G2L3G2D2R7BR9
1240 RETURN
1250 FF$="BU8E2R3F2D1G2NL2F2D2G1L6NE2BR16
1260 RETURN
1270 FF$="BU6NE6R7BL1ND6D6BR16"
1280 RETURN
1290 FF$="BD18NR7D3F2R3F2D2G1L4NB2BR16"
1300 RETURN
1310 FF$="BU18NR5L3G2D8F2R1E2U2H1L3G1BU6BR16"
1320 RETURN
1330 FF$="BU9U1R7G6D6BR15"
1340 RETURN
1350 FF$="BD2U2BU2U2E2R3F2D2BU1BL2NL3F2D1G2L3BR16"
1360 RETURN
1370 FF$="BU7U1E2R3F2D3NL5D4G1L4NE2BR16"
1380 RETURN
1390 REM  SCORE ROUTINE
1400 S1=S1+1
1410 IFS1=10THENS1=0:FF$=BB$:GOTO1430
1420 ON S1 GOSUB1210,1230,1250,1270,1290,1310,1330,1350,1370,113
0
1430 DD$=FF$
1440 IFS1=0THEN S2=S2+1
1450 IFS2=10THEN S2=0:CC$=BB$:GOTO1480
1460 IFS2>0THEN C=C:ON S2 GOSUB1210,1230,1250,1270,1290,1310,133
0,1350,1370
1470 IFS1>0GOTO1530
1480 CC$=FF$
1490 IFS2=0THEN S3=S3+1
1500 IFS3>0THEN C=C:ON S3 GOSUB1210,1230,1250,1270,1290,1310,131
0,1350,1370
1510 IFS2>0THER1530
1520 BB$=FF$
1530 GOSUB1180
1540 REM  INCREASE GAME SPEED IF RIGHT CONDITIONS ARE MET
1550 IFS2=3AND L1<6THEN L1=6:L2=2:P5$=P6$
1560 IFS3=1AND L1<6THEN L1=6:L2=3
1570 IFS3=2ANDL1<6THEN L1=8:L2=4
1580 RETURN
1590 REM  CHECK FOR 0 OF CITIES/END IF ZERO/IF ONE CITY LEFT AND
 SCORE OVER 90 SUBTRACT POINTS ADD CITIES-ONLY DO ONICE
1600 FOR T=15TO75STEP3
1610 X=PPOINT(T+5,188)
1620 IF X=0THEN W=W+1
1630 NEXT T
1640 FOR T=230TO160STEP-3
1650 U=PPOINT(T+5,185)
1660 IF U=0THEN W=W+1
1670 NEXT T
1680 IF W=0THEN1730
1690 IF W=1THEN LC=LC+1:IFLC>2THEN1700ELSE C=C:GOSUB1800
1700 X=0:W=0:T=0:U=0
1710 RETURN
1720 REM  FLASH SCREEN/SHOW SCORE/END GAME/START OVER
1730 FOR XP=1TO18:SCREEN1,0:SOUND188,1:SCREEN1,1:SOUND50,1:NEXTX
P:CLS:PRINT:PRINT:PRINT:PRINT:PRINTTAB(8)LO$;
1740 AW=S3*1000:AE=S2*100:AY=S1*10
1750 AU=AW+AE+AY
1760 PRINT:PRINT:PRINT:PRINT" YOUR SCORE:"AU;
1770 FOR BB=1TO2000:NEXT BB
1780 GOTO30
1790 REM  SUBTRACT POINTS IF POSSIBLE
1800 IFS1>0THEN S1=S1-9:GOSUB1600:GOSUB320:RETURN
1810 IFS2>0THEN S2=S2-1:IF S2=0THEN1840ELSE C=C:ON S2 GOSUB1210,
1230,1250,1270,1290,1310,1330,1350,1370:CC$=FF$:GOSUB1180:GOSUB3
20:RETURN
1820 IFS3>0THEN S3=S3-1:IFS3=0THEN1850ELSE C=C:ON S3GOSUB1000,11
00,1120,1140,1160,1180,1200,1220,1240:BB$=FF$:S2=8:S1=8:GOSUB164
0:GOSUB1180:GOSUB320:RETURN
1830 RETURN
1840 CC$=BB$:GOSUB1180:GOSUB320:RETURN
1850 BB$=BB$:GOSUB1180:S2=S2+0:S0=S1:S1=0:GOSUB1660:GOSUB320:S1=
S0:RETURN
1860 CLS:PRINT:PRINT" ********************************"
1870 PRINT:PRINT"          MISSILE ATTACK"
1880 PRINT:PRINT"                BY
1890 PRINT:PRINT"           L. F. PERRY":PRINT
1900 PRINT:PRINT"           VERSION 1.1":PRINT"          REQUIRES
16.5K "
1910 PRINT
1920 PRINT:PRINT" ********************************"
1930 FOR NJ=1TO2000:NEXT NJ
1940 GOTO30
1950 REM  END OF GAME REMARKS
1960 V=AND(5)
1970 ON V GOTO 1980,1990,2000,2010,2020
1980 LO$="YOU NEER IT":GOTO1730
1990 LO$="YOU LOSE":GOTO1730
2000 LO$="TRY HARDER...?":GOTO1730
2010 LO$="BETTER LUCK NEXT TIME":GOTO1730
2020 LO$="TOUGH LUCK"
2030 GOTO1730
2040 REM RESET ALL LINES/GET POSITIONS   FOR NEXT ATTACK
2050 LINE(BB,BR)-(BB+B,BR+D),PRESET:LINE(CC,CA)-(CC+B,CA+F),PRES
ET:LINE(DD,DA)-(DD+B,DA+I),PRESET
2060 D=0:B=0:C=0:F=0:E=0:G=0:H=0:I=0:J=0:BR=15:CA=15:DA=15:READB
B,C:GOSUB2550:READCC,G:GOSUB2550:READDD,J:GOSUB2550
2070 GOSUB2290
2080 REM  PICK TYPE OF ALIEN FOR ATTACK
2090 BB=AND(6):IFBB=2THEN2040
2100 IFBB=3THEN2090
2110 IFBB=4THEN2520
2120 REM  DEFAULT ALIEN TYPE
2130 IN$="H6E6F6G6BU2":IO$="H6E6F6G4BU2BR2":IP$="H2E2F2G2":IQ$="
R4U8L8D8R4":IR$=IN$:IS$="C4":IT$="C4"
2140 REM  ALIEN ATTACK LOOP
2150 AA=JOYSTK(0)*6:AB=JOYSTK(1)*6:VA=VA+VC:VB=VB+VD
2160 IFAB>150THEN AB=150
2170 IFAB<2THEN AB=2
2180 IFNQ=1THEN IN$=IQ$:NQ=0:GOTO2210
2190 IFNQ=0THEN IN$=IR$:NQ=1
2200 PLAY"V30O4L48A
2210 COLOR4,1:LINE(AA,AB)-(AA+5,AB+1),PSET:DRAW"C2;BM"+STR$(VA)+
","+STR$(VB)+IN$+IS$+IO$+IT$+IP$
2220 LINE(AA,AB)-(AA+5,AB+1),PRESET
2230 IFVB>160THEN1960
2240 POKE65494,0:P=PEEK(65280):POKE65495,0:IFP=126OR P=254THEN23
70
2250 DRAW"C1;BM"+STR$(VA)+","+STR$(VB)+IN$+"C1;"+IO$+IP$
2260 GOTO2150
2270 REM  END OF ALIEN ATTACK LOOP
2280 REM  GET ALIEN ATTACK POSITION/ANGLE
2290 BS=RND(5):IFBS=0THEN2290
2300 ON BS GOTO2310,2320,2330,2340,2350
2310 VA=18:VB=30:VC=5:VD=6:RETURN
2320 VA=126:VB=30:VC=0:VD=6:RETURN
2330 VA=222:VB=30:VC=-4:VD=6:RETURN
2340 VA=68:VB=30:VC=2:VD=4:RETURN
2350 VA=198:VB=30:VC=-2:VD=6:RETURN
2360 REM  CHECK HIT ON ALIEN/ADD POINTS AND ELIMINATE ALIEN IF H
IT AND RETURN TO FIRST LOOP
2370 G1=PPOINT(AE+2,AB-1):G2=PPOINT(AA+2,AB-2)
2380 COLOR4,1:LINE(126,164)-(AA+2,AB),PSET
2390 POKE65494,0:PLAY P3$:POKE65495,0
2400 LINE(126,164)-(AA+2,AB),PRESET
2410 IFG1=80R G2=8THEN2420ELSE2440
2420 COLOR4,1:FOKX=1TO18:CIRCLE(AA+2,AB+2),X,6:NEXTN
2430 FOKX=18TO1STEP-1:CIRCLE(AE+2,AB+2),X,1:NEXTN
2440 DRAW"C1;BM"+STR$(VA)+","+STR$(VB)+IN$+IO$+IP$
2450 IFG1=8UR G2=8THEN POKE65496,0:PLAY P1$:POKE65495,0:GOSUB320
:GOSUB1480:GOSUB1480:GOSUB1480:GOSUB1480:GOSUB1480:GOSUB1480:GOS
UB1480:GOSUB1480:GOSUB1480:GOSUB1480:GOTO470
2460 GOTO2150
2470 REM  ALIEN ANIMATION VARIABLES
2480 IO$="BL2BD1U4E4RD4U3NR2G4L2ND2EU2L2D3D3R2U2":IN$="NU4BL3NU4
BL5D3BL2BD4":IQ$="NU4R3ND4BL5D3BL2BD4":IP$="BU3R2":IR$=IN$:IS$=
"C2":IT$="C4"
2490 GOTO2150
2500 IO$="BR1BL16U2BR2R12BU2BL2L1BBU2R1BBU2BR2L14NG2BR14F2":IR$=
"BBH6L6G6F6BU14":IQ$="BL6U6H6L6G6D6BR6BU16":IP$="BL7BD4L2R4":IN$
=IN$:IS$="C2":IT$="C4"
2510 GOTO2150
2520 IO$="BL4NU4ND6R2NU4ND6";IN$="BU6G6D2B8BR8F6D2H8":IQ$="BU6H6
U2F8BH8E6U2G6":IP$="":IR$=IN$:IS$="C4"
2530 GOTO2150
2540 REM  CHECK FOR END OF DATA
2550 KH=KH+1:IFKH=35THEN RESTORE:KH=0
2560 RETURN
```

It's a fact, most games for your computer are geared for kids. There's nothing really wrong with that, but grown-ups need to "play" sometimes, too. Nothing we sell is pornographic or obscene, but some of our programs are intended to be used only by adults. Here's a sampling of our best sellers.

SPACE SULTAN:SPECTRUM's runaway best-seller combines arcade-style action and animation to create the industry's first adult arcade game. Destroy the mutant attackers before they reach the ground and threaten mankind's very existence. INCLUDES RECORDED GAME INSTRUCTIONS!
AN ADULT ARCADE-STYLE GAME. ORDER #1001 16K TRS-80 MODEL I/III 19.95

BOSS'S PARTY: The boss is throwing the wildest, swingingest office party, and you're invited! As many as 20 can play this hilarious, exciting and daring electronic board game.
AN ELECTRONIC BOARD GAME. ORDER #1015 16K TRS-80 MODEL I/III 17.95
SPECIAL!!! ORDER #1016 16K ATARI 400/800 W/Basic 16.95

TANGLE: Turn your parties into "contact sports" with this rather tame electronic party game for 2-50 players. This game is exactly what you make it: tame, mild, spicy or wow!
AN ELECTRONIC PARTY GAME
ORDER #1048 16K TRS-80 MODEL I/III 12.95
ORDER #1049 16K ATARI 400/800 W/BASIC 13.95

Get Rich! Make Friends! Influence People! Become Famous! Sound good? Send us your TRS-80, Atari or Apple game software. We'll sell it for you and deliver the INDUSTRY'S HIGHEST ROYALTIES! Submit to address on order form, include SASE for immediate evaluation, include postage if you want the tape back.

Mastercharge, Visa, C.O.D. orders: Call our 24-hour toll free order line (orders only, please):
U.S. (EXCEPT KANSAS): **800-835-2248, ask for extension 383**
✓ 545 KANSAS ONLY: **800-362-2421, ask for extension 383**
Phone orders: the operator will request the necessary information. Save time by having the program order number(s) handy. C.O.D. orders are shipped cash/certified check only, you pay shipping.
Mail orders: Send a check or money order, along with the program order number to:
SPECTRUM
P.O. BOX 1736 DEALER INQUIRIES
BINGHAMTON, NY 13902 INVITED!

TRS-80, Apple and Atari are trademarks of Tandy Corp., Apple and Atari

✓ See List of Advertisers on page 338

Step up from Rubik's Cubes with Ridgway's Ovals.

Loco Motion

Dennis Ridgway
2160 Frisco Avenue
Terre Haute, IN 47805

This solitaire game requires concentration, dexterity and patience. The playing field consists of three concentric tracks, on which 12 units take turns relentlessly rotating. The units are identified as 1, 2, 3, 4, 5, 6, 7, 8, 9, X, Y and Z.

A normal move is an advance of two positions on the same track. Control keys are used to make units slow down (advance only one position) or speed up (advance three positions). Control keys also direct units to adjacent tracks.

The object of the game is to align the 12 units with a pre-established target pattern in as few moves as possible. The target pattern can be selected from eight preprogrammed patterns (Fig. 1) or, if you wish, custom-designed. Once a target pattern has been established it is continually displayed with a counter showing the number of moves.

During play, units may be moved to the inside of the innermost track (the infield). They can be returned to play on a subsequent turn. Units may also be moved to the outfield, the outside of the outermost track. From there, they cannot be returned to play.

When all 12 units match their corresponding target positions the display is frozen and the game is over. During play the screen can be frozen by the operator by pressing Shift@. The program includes complete playing instructions. ■

Dennis Ridgway, a data processor, enjoys his micro, gardening and motorcycles.

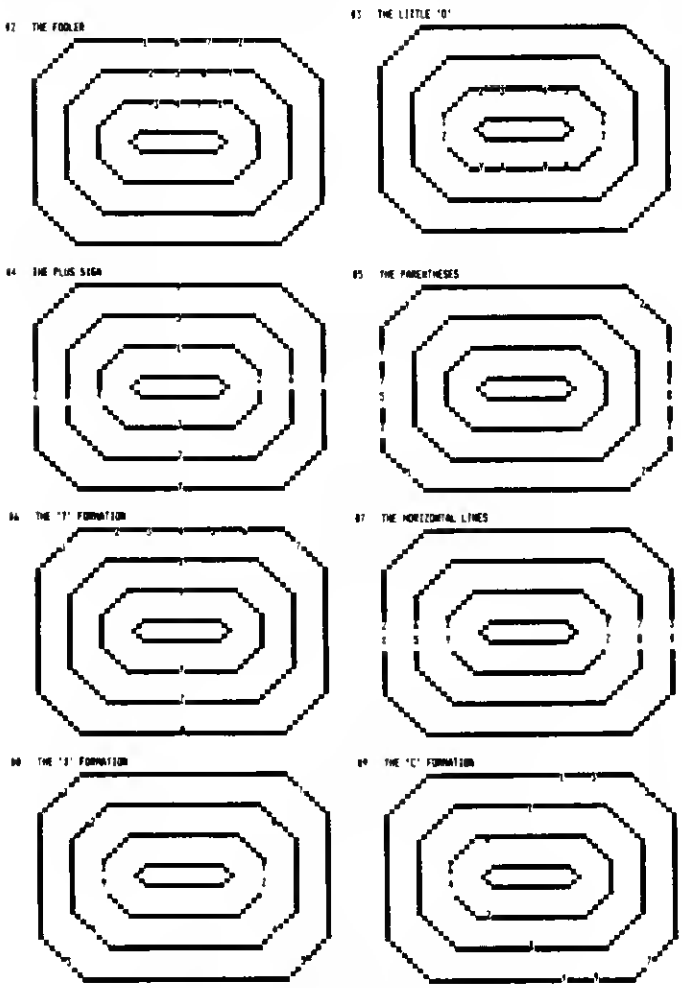


Fig. 1. Preprogrammed Target Patterns

The Key Box

Model I
16K RAM
Cassette Basic

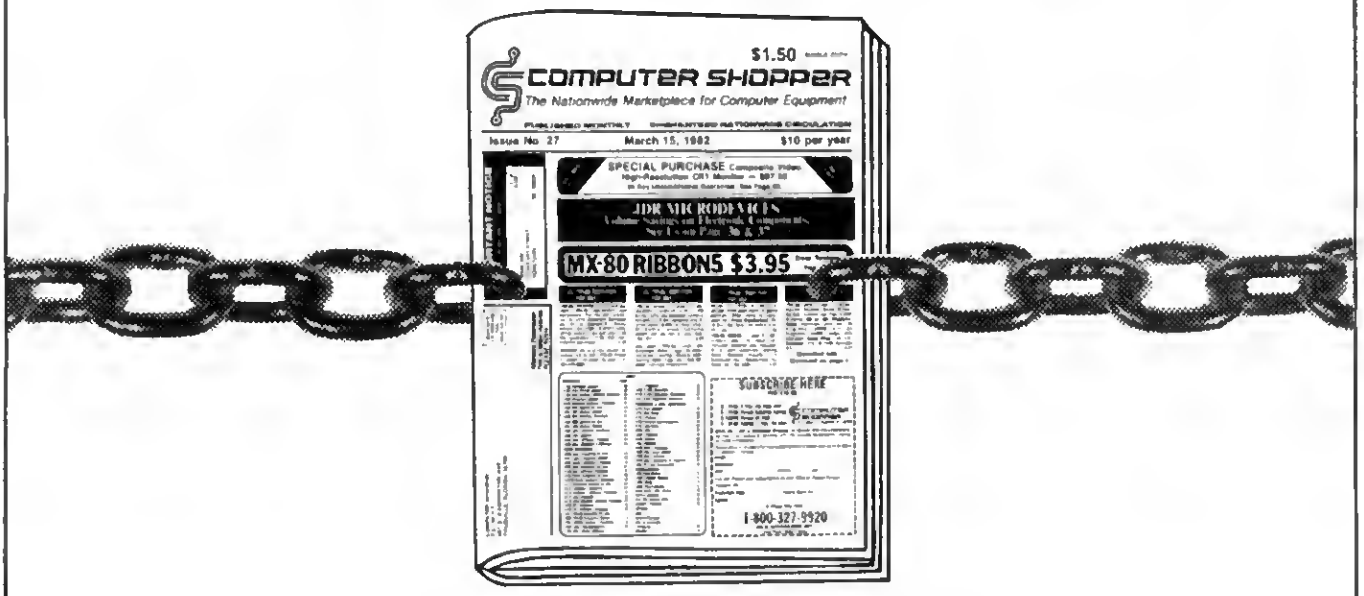
Program Listing

```
50 CLS:CLEAR15:DEFINTA-Z:M=15361:M$="HIT ENTER TO PROCEED"
60 DIMRA(5):RA(1)=15:RA(2)=15:RA(3)=19:RA(4)=23:RA(5)=23
70 DIMQR(4):DIMQU(4):DIMQT(4):DIMQS(4):DIMQK(4)
80 DIMTN(12):DIMSN(12):DIMHT(12):DIMHS(12)
150 GOSUB2000:GOSUB40000:PRINT@1000,M$;
220 IFINKEY$=""220
250 GOSUB21000:GOSUB40200:PRINT@1000,M$;
320 IFINKEY$=""320
350 GOSUB22000:GOSUB40500:PRINT@1000,M$;
370 IFINKEY$=""370
400 GOSUB23000:GOSUB40700:PRINT@1000,M$;
420 IFINKEY$=""420
600 GOSUB26015
700 GOSUB28000:GOSUB28200:PRINT@54,"COUNTER";:GOSUB1810
900 GOSUB3000:GOTO900
1010 NU=0:FORX=1TO12:TN(X)=T2(X):SN(X)=S2(X):NEXT
1070 TY=6:FORSK=1TO12:TX=TN(SK):SX=SN(SK):GOSUB11000
1080 NEXT:SK=0:PL=0:RETURN
3000 SK=SK+1:IFSK=13THENSK=1
3002 IFPL=1THENPL=2ELSEPL=1
3004 LE=0:RI=0:SL=0:FA=0
3010 IFPL=1THENGOSUB4100ELSEGOSUB5000
3020 P1=0:P2=0:P3=0
```

Program continues

YOU'VE JUST FOUND

THE MISSING LINK!



Computer Shopper is *your link* to individuals who buy, sell and trade computer equipment and software among themselves nationwide. No other magazine fills this void in the marketplace chain.

Thousands of cost-conscious computer enthusiasts save by shopping in Computer Shopper every month through hundreds of classified ads. And new equipment advertisers offer some of the lowest prices in the nation.

Computer Shopper's unbiased articles make for some unique reading among magazines and there's a "help" column to answer difficult problems you may have with interfacing, etc.

For a *limited time* you can subscribe to Computer Shopper with a six month trial for only $6.

You risk nothing, because if you're not 100% satisfied after receiving the first issue, you may cancel and receive a full refund. No questions asked!

If you have a MasterCard or VISA charge you may subscribe by calling the 24 hour order desk TOLL FREE 800-327-9920. All other calls for information, etc. can only be answered at our business office from 8 a.m. to 5 p.m. Monday through Friday at 305-269-3211. Call or send your check or money order TODAY while the offer is still good.

6 month trial, $6.00 CALL TOLL FREE 24 HR. ORDER DESK MC & VISA ONLY **800-327-9920**
except Florida, Alaska, Hawaii

COMPUTER SHOPPER
P.O. Box F321 • Titusville, FL 32780
305-269-3211

39

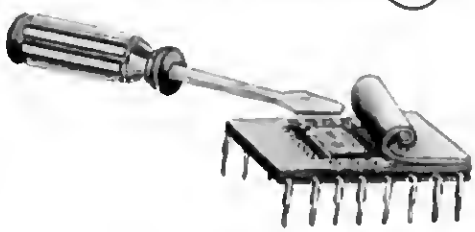
See List of Advertisers on page 338

Program continued

```
3030 IFSL+FA=0ORSL+FA=2GOTO3050
3040 IFSL=1THEN3060ELSEP3=1
3050 P1=1
3060 IFLE+RI=0ORLE+RI=2THENP2=2:GOTO3080
3070 IFLE=1THENP2=1ELSEP2=3
3080 IFP2=1THENGOSUB6000ELSEGOTO3090
3085 GOSUB15000
3090 IFP2=2THENGOSUB8000ELSEGOTO3100
3095 GOSUB15000
3100 IFP2=3THENGOSUB9000ELSEGOTO3110
3105 GOSUB15000
3110 IFP1=1THENGOSUB8000ELSEGOTO3120
3115 GOSUB15000
3120 IFP3=1THENGOSUB8000ELSEGOTO3130
3125 GOSUB15000
3130 RETURN
4100 X=PEEK(14340)
4110 IF(XAND132)>0FA=1
4120 IF(XAND8)>0LE=1
4130 X=PEEK(14337)
4140 IF(XAND32)>0FA=1
4150 IF(XAND2)>0LE=1
4160 IF(XAND80)>0RI=1
4170 IF(XAND8)>0SL=1
4180 X=PEEK(14344)
4190 IF(XAND5)>0SL=1
4200 RETURN
5000 X=PEEK(14338)
5010 IF(XAND130)>0FA=1
5020 IF(XAND12)>0LE=1
5030 IF(XAND16)>0RI=1
5040 IF(XAND32)>0SL=1
5050 X=PEEK(14340)
5060 IF(XAND1)>0FA=1
5070 X=PEEK(14360)
5080 IF(XAND8)>0RI=1
5090 IF(XAND80)>0SL=1
5100 RETURN
6000 QC=1'LEFT
6010 TX=TN(SX):QR(QC)=TX:SX=SN(SX):QU(QC)=SX
6020 SX=SX+1:IFSX=RA(TH)THENSX=1
6030 ONTXGOTO6031,6032,6033,6034,6035
6031 RETURN
6032 GOTO6030
6033 SX=CI(SX):GOTO6030
6034 SX=DI(SX):GOTO6030
6035 RETURN
6038 TH=TX-1:QT(QC)=TH:QK(QC)=SX
6040 ONTHGOTO6041,6042,6043
6041 X=BI(SX):GOTO6090
6042 X=BT(SX):GOTO6090
6043 X=CT(SX)
6090 QS(QC)=SX
6095 X=PEEK(X)
6100 IFX>90ORX<49GOTO7000
6110 IFTH<>1GOTO6200
6120 SX=SX+1:IFSX=RA(TH+1)THENSX=1
6130 GOTO6040
6200 QC=QC+1:SK=X-48:IFSK>9THENSK=SK-30
6210 GOTO6010
7000 FORX3=QCTO1STEP-1
7010 SX=QK(X3):TX=QT(X3):TH=QR(X3):SX=QS(X3):SY=QU(X3)
7020 GOSUB11000
7025 TH(SX)=TX:SN(SX)=SX
7030 NEXT
7040 RETURN
8000 TX=TN(SX):SX=SN(SX)
8010 SX=SX+1:IFSX=RA(TX)THENSX=1
8020 ONTXGOTO8021,8022,8023,8024,8025
8021 RETURN
8022 X=BT(SX):GOTO8030
8023 X=CT(SX):GOTO8030
8024 X=DT(SX):GOTO8030
8025 RETURN
8030 IFPEEK(X)<>32RETURN
8040 TH=TN(SX):SY=SN(SX):TH(SX)=TH:SN(SX)=SX
8050 GOSUB11000
8060 RETURN
9000 QC=1'RIGHT
9010 TX=TN(SX):QR(QC)=TX:SX=SN(SX):QU(QC)=SX
9020 SX=SX+1:IFSX=RA(TX)THENSX=1
9030 ONTXGOTO9031,9032,9033,9034,9035
9031 GOTO9039'USE SX
9032 SX=BO(SX):GOTO9039
9033 SX=CO(SX):GOTO9039
9034 GOTO9039
9035 RETURN
9039 TX=TX+1:QT(QC)=TX:QK(QC)=SK
9040 ONTXGOTO9041,9042,9043,9044,9045
9041 END
9042 X=BT(SX):GOTO9050
9043 X=CT(SX):GOTO9050
9044 X=DT(SX):GOTO9050
9045 X=OO(SX)
9050 QS(QC)=SX:X=PEEK(X):IFX=32GOTO10000
9051 IFTN=2THENRETURN
9052 IFTX<>5THEN9100
9060 SX=SX+1:IFSX=RA(TX)THENSX=1
```

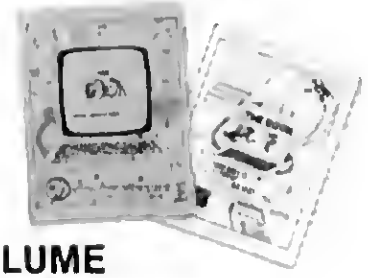
Program continues

Accessing the TRS-80* ROM...



←or→

It's your choice:
do it the hard way, or
get the information you need from



THE BØØK VOLUME I & II

Comprehensive Guide to TRS-80* Assembly Language Routines

Each Volume Priced At $14.95 Plus $1.50 Shipping/Handling
VA residents add 4% tax • Foreign: send U.S. funds, add $4 ea. for overseas delivery

-126

*Trademark of Tandy Corp.

VOLUME I

The most complete book yet on the math routines of the BASIC ROM Models I & III. Contains a wealth of detail about integer, single and double precision formats, advanced math, data manipulation, and assembly language interfacing with examples. Includes commented listing (0708H-1607H), plus a highly detailed map of the ROM and reserved RAM.

INSIDERS SOFTWARE CONSULTANTS, INC.
P.O. Box 7088, Dept. SUM3 • Alexandria, VA 22307

Please send THE BØØK: ☐ Volume I ☐ Volume II
Name _____
Address _____
City _____ State _____ Zip _____
Enclosed is ☐ check ☐ M.O. for $ _____
Charge to my ☐ VISA ☐ MasterCard Bank Code _____
Exp. date _____ Card No. _____
Signature _____

VOLUME II

Packed full of useful information on the model I input/output routines, with detailed listings to illustrate the commented source code. Learn to control and manipulate the keyboard, video, printer port, and cassette port. Essential for assembly language programmers, you can write your own routines or use the many programming examples included.

Program continued

```
9070 GOTO9040
9100 QC=QC+1:SK=X-48:IFSK>9THENSK=SK-3
9110 GOTO9010
10000 FORI=QCTO1STEP-1
10010 SR=QR(X3):TX=QT(X3):TT=QR(X3):SX=QS(X3):SY=QU(X3)
10020 GOSUB11000
10025 TH(SX)=TX:SN(SX)=SX
10030 NEXT
10040 RETURN
11000 ID=SX+48:IFID>57THENID=ID+39'DISPLAY UNITS
11010 ONTYGOTO11011,11012,11013,11014,11015
11011 X1=BI(SX):GOTO11031
11012 X1=BT(SX):GOTO11030
11013 X1=CT(SX):GOTO11030
11014 X1=DT(SX):GOTO11030
11015 X1=DO(SX)
11030 POKEX1-1,40:POKEX1+1,41
11031 POKEX1,ID
11050 ONTYGOTO11061,11062,11063,11064,11065,11100
11061 X2=BI(SY):GOTO11110
11062 X2=BT(SY):GOTO11070
11063 X2=CT(SY):GOTO11070
11064 X2=DT(SY):GOTO11070
11065 X2=GO(SY)
11070 POKEX2-1,32:POKEX2,32:POKEX2+1,32
11100 NU=NU+1:PRINT@119,NU;:RETURN
11110 POKEX2,RP(SY):RETURN
15000 'TEST
15010 FORX=1TO12
15020 IFSN(X)<>HS(X)THENRETURN
15030 IFTH(X)<>HT(X)TNENRETURN
15040 NEXT
15050 PRINT@0,"CONGRATULATIONS - YOU DID IT";
15055 B$=INKEY$:PRINT@960,"TO REPEAT THIS PATTERN ENTER 'R',TO P
ICK A NEW ONE ENTER 'N'";:A=1:GOSUB24000:IFB$="R"THEN7000ELSE600
15060 GOTO15060
20000 CLS:PRINT@17,"- LOCO MOTION -"
20010 PRINT@133,"THE PLAYING FIELD CONSISTS OF THREE CONCENTRIC
TRACKS"
20020 PRINT@192,"ON WHICH 12 UNITS CONTINUALLY ROTATE."
20030 PRINT@261,"THE OBJECT OF THE GAME IS TO ALIGN THE 12 MOVIN
G UNITS"
20040 PRINT@325,"WITH A PRESELECTED TARGET PATTERN"
20050 PRINT@460,"PATTERN SELECTION METHODS"
20170 PRINT@576,"-  YOU CAN SELECT 1 OF 8 PREPROGRAMMED PATTERNS
"
20191 PRINT@704,"-  YOU CAN DESIGN THE PATTERN YOURSELF"
20200 PRINT@832,"-  YOU CAN REPEAT THE LAST COMPLETED PATTERN"
20999 RETURN
21000 CLS:PRINT@25,"CONTROL KEYS"
21010 PRINT`69,"THE 12 UNITS ARE NUMBERED AND MOVE IN THE ORDER
"
21020 PRINT@140," 1  2  3  4  5  6  7  8  9  X  Y  Z"
21025 PRINT@256,"CONTHOL KEYS":PRINT@386,"CONTROL KEYS"
21030 PRINT@328,"FOR ODD UNITS":PRINT@378,"FOR EVEN UNITS"
21040 PRINT@384,"1,3,5,7,9,Y":PRINT@434,"2,4,6,8,X,Z"
21060 PRINT@512,"    W E R                    FAST - ADVANCE 3
    I O P"
21070 PRINT@576,"A S                         MOVE TO INSIDE
  J K"
21080 PRINT@658,"D F             MOVE TO OUTSIDE
  L ;"
21090 PRINT@708,"Z X C                  SLOW - ADVANCE 1
  M , ."
21100 PRINT@768,"   NO KEYS                  NORMAL - ADVANCE 2
    NO KEYS"
21999 RETURN
22000 CLS:PRINT@25,"MOVEMENT"
22010 PRINT@197,"TRACK MUST BE OPEN FOR UNITS TO MOVE STRAIGHT A
HEAD"
22020 PRINT@325,"UNITS MOVING TO THE INSIDE OR OUTSIDE WILL MOVE
 REGARDLESS"
22030 PRINT@384,"OF WHETHER OR NOT THE TRACK IS OPEN. IF THE WAY
 IS BLOCKED"
22040 PRINT@448,"THE BLOCKING UNIT WILL BE BUMPED OUT OF THE WAY
. IT MAY"
22050 PRINT@512,"IN TURN BUMP ANOTHER UNIT."
22060 PRINT@645,"THE DIAGONAL INSIDE OR OUTSIDE MOVE OCCURS PRIO
R TO THE"
22070 PRINT@704,"FORWARD ADVANCE PORTION OF THE MOVE."
22999 RETURN
23000 CLS:PRINT@25,"INFIELD"
23010 PRINT@133,"UNITS MOVED OR BUMPED INTO THE INFIELD IN THE C
ENTER OF"
23020 PRINT@192,"THE TRACKS CAN BE MOVED BACK ONTO THE PLAYING F
IELD BY"
23030 PRINT@256,"KEYING A 'MOVE TO OUTSIDE', HOWEVER THE ADJACEN
T POSITION"
23040 PRINT@328,"ON THE TRACK MUST BE OPEN."
23050 PRINT@537,"OUTFIELD"
23060 PRINT@645,"UNITS MOVED OR BUMPED TO THE OUTFIELD ARE OUT O
F PLAY AND"
23070 PRINT@704,"CANNOT BE RETURNED TO THE PLAYING FIELD"
23999 RETURN
24000 B$="":PRINTCHR$(14);
24010 A$=INKEY$:IFA$>""IFA$=CHR$(13)THENPRINTCHR$(15);:RETURNELS
EIFA$>CHR$(31)ANDLEN(B$)<ATHENPRINTA$;:B$=B$+A$ELSEIFB$>""IFA$=C
HR$(8)THENPRINTA$;:B$=LEFT$(B$,LEN(B$)-1)ELSEIFA$=CHR$(24)THENPR
```

Program continues

Introducing T80-SG2
Forest Fire Dispatcher

Forest Fire Dispatcher combines the complex challenge of of a realistic simulation with the ease of operation necessary to allow you to concentrate all your energy and imagination on the job at hand.

T80-SG2 Forest Fire Dispatcher is available on cassette and disk. Both versions contain a 30-minute game. The disk also includes a longer lasting game simulation.

T80-SG2 Forest Fire Dispatcher — a naturally deep strategy game designed to provide you with years of pleasurable interaction.

$24.95 on cassette (16K required)
$29.95 on disk (32K required)
Specify Model I (Level 2 BASIC) or Model III TRS-80

subLOGIC
Communications Corp.
713 Edgebrook Drive
Champaign, IL 61820
(217) 359-8482
Telex: 206995

See your dealer!

For direct order please specify whether you need Model I or Model III (the Models are different) and whether you want disk or cassette. Include $1.50 and indicate UPS or first class mail. Illinois residents add 5% sales tax.

See List of Advertisers on page 338

Program continued

```
INTSTRING$(LEN(B$),8);:B$=""
24020 GOTO24810
26015 CLS:PRINT@16,"SELECT YOUR PATTERN"
26020 PRINT@138,"1  TO SPECIFY YOUR OWN PATTERN"
26030 PRINT@197,"THE FOLLOWING ARE PREPROGRAMMED PATTERNS"
26032 PRINT@266,"2  THE FOOLER"
26035 PRINT@330,"3  THE LITTLE 'O'"
26040 PRINT@396,"4  THE PLUS SIGN"
26045 PRINT@458,"5  THE PARENTHESES"
26050 PRINT@522,"6  THE 'T' FORMATION"
26055 PRINT@586,"7  HORIZONTAL LINES"
26060 PRINT@650,"8  THE 'X' FORMATION"
26065 PRINT@714,"9  THE 'C' FORMATION"
26070 PRINT@832,"ENTER CODE";:INPUTP
26120 IFP=1GOTO26500'GO IT YOURSELF
26130 IFP=2THENFORX=1TO12:BT(X)=T2(X):BS(X)=S2(X):NEXT:GOTO26250

26140 IFP=3THENFORX=1TO12:BT(X)=T3(X):BS(X)=S3(X):NEXT:GOTO26250

26150 IFP=4THENFORX=1TO12:BT(X)=T4(X):BS(X)=S4(X):NEXT:GOTO26250
26160 IFP=5THENFORX=1TO12:BT(X)=T5(X):BS(X)=S5(X):NEXT:GOTO26250

26170 IFP=6THENFORX=1TO12:BT(X)=T6(X):BS(X)=S6(X):NEXT:GOTO26250

26180 IFP=7THENFORX=1TO12:BT(X)=T7(X):BS(X)=S7(X):NEXT:GOTO26250

26190 IFP=8THENFORX=1TO12:BT(X)=T8(X):BS(X)=S8(X):NEXT:GOTO26250

26200 IFP=9THENFORX=1TO12:BT(X)=T9(X):BS(X)=S9(X):NEXT:GOTO26250

26240 GOTO26070
26250 GOSUB28000
26260 GOSUB28200
26270 PRINT@0,"ENTER Y TO PLAY THIS PATTERN, ENTER N TO SELECT A
NOTHER";:INPUTP$
26280 IFP$="N" GOTO26015
26310 RETURN
26500 GOSUB28000'GO IT
26510 GOSUB26500
26515 PRINT@0,"ENTER TARGET LOCATIONS FOR EACH UNIT AT BOTTOM OF
 SCREEN";
26525 PRINT@960,"1";CHR$(94);"X";
26530 FORX=1TO12
26540 PRINT@964+(X-1)*5,"    ";
26545 PRINT@964+(X-1)*5,"?";
26550 A=3:GOSUB24000:IFB$=""GOTO26540
26570 BT(X)=ABC(LEFT$(B$,1))-63
26575 IFRIGHT$(B$,1)=" "THENY=1ELSEY=2
26580 P=VAL(MID$(B$,2,Y))
26590 LI=(BT(X)-2)*4+14
26600 IFBT(X)<2ORBT(X)>4THEN26540
26610 IFP<1ORP>LITHEN26540
26615 BS(X)=P
26620 X1=X+48:IFK1>57THENX1=K1+38
26630 ONBT(X)GOTO26640,26642,26643,26644
26640 STOP
26642 POKEPA(P),X1:GOTO26650
26643 POKEPB(P),X1:GOTO26650
26644 POKEPC(P),X1
26650 NEXT:GOTO26250
28000 CLS:FORX=15847TO15933STEP-1:POKEX,131:NEXT
28010 FORX=1TO3:POKEB1(X),C1(X):NEXT
28020 FORX=15897TO15911:POKEX,140:NEXT
28030 FORX=3TO15STEP-1:POKED1(X),C1(X):NEXT
28040 FORX=15722TO15782STEP-1:POKEX,131:NEXT
28050 FORX=1TO11:POKEB2(X),C2(X):NEXT
28060 FORX=16022TO16062:POKEX,140:NEXT
28070 FORX=11TO15STEP-1:POKED2(X),C2(X):NEXT
28080 FORX=15598TO15578STEP-1:POKEX,131:NEXT
28090 FORX=1TO18:POKEB3(X),C3(X):NEXT
28100 FORX=16146TO16174:POKEX,140:NEXT
28110 FORX=18TO1STEP-1:POKED3(X),C3(X):NEXT
28120 FORX=15475TO15437STEP-1:POKEX,131:NEXT
28130 FORX=1TO23:POKEB4(X),C4(X):NEXT
28140 FORX=16269TO16307:POKEX,140:NEXT
28150 FORX=23TO1STEP-1:POKED4(X),C4(X):NEXT
28160 RETURN
28200 FORX=1TO12
28210 SK=X+48:IFSK>57THENSK=SK+38
28220 T=BB(X)
28230 ONBT(X)GOTO28240,28241,28242,28243
28240 STOP
28241 POKEPA(Y),SK:GOTO28250
28242 POKEPB(Y),SK:GOTO28250
28243 POKEPC(X),SK
28250 NEXT
28260 RETURN
28500 FORX=1TO9:PRINT@BT(X)-M,"A";CHR$(X+48);:NEXT'TRK POS
28510 FORX=0TO4:PRINT@BT(X+10)-M,"A1";CHR$(X+48);:NEXT
28520 FORX=1TO9:PRINT@CT(X)-M,"B";CHR$(X+48);:NEXT
28530 FORX=0TO8:PRINT@CT(X+10)-M,"B1";CHR$(X+48);:NEXT
28540 FORX=1TO9:PRINT@DT(X)-M,"C";CHR$(X+48);:NEXT
28550 FORX=0TO9:PRINT@DT(X+10)-M,"C1";CHR$(X+48);:NEXT
28560 FORX=0TO2:PRINT@DT(X+20)-M,"C2";CHR$(X+48);:NEXT
28570 RETURN
40000 DATA15776,15772,15768,15628,15892,15968,15964,15968,15972,
15976,15916,15852,15784,15788
40010 DIMBT(14):FORX=1TO14:READBT(X):NEXT
40020 DATA15648,15643,15638,15696,15822,15886,16016,16086,16091,
16096,16101,16186,16048,15922,15858,15728,15658,15653
40030 DIMCT(18):FORX=1TO18:READCT(X):NEXT
```

Program continues

✓ CHECK US FIRST!
for
DISCOUNT TRS-80 COMPUTERS

BUY DIRECT

- ✓ No Out-of-State - Taxes - Kansans Add 4%
- ✓ Large Inventory for Immediate Shipment
- ✓ 100% TRS-80® Equipment
- ✓ Convenient Order Number
- ✓ F-48 Form Provided

TRS-80
CALL US FOR
OUR PRICES
and PRICE List

1-800-835-9056

- ✓ Visa, Mastercard
- ✓ Wire Transfers
- ✓ Bank Cashier's Checks & Money Orders.

Jimscot, Inc.
1023 N. Kansas
P.O. Box 607
Liberal, Ks. 67901

Kansas Residents:
316-624-1919 (Collect)

TRS-80 is a registered Trademark of Tandy Corp.

✓ 254

Maximize the potential of your TRS-80*

Encyclopedia for the TRS-80*

What's the key to getting the most from your TRS-80? No, it isn't the disk drives or printers or joysticks. It's information. Without a continual supply of information and ideas, you cannot realize the full potential of the TRS-80.

Our response to the clamor for additional information is the **Encyclopedia for the TRS-80**, a ten-volume reference work of programs and articles carefully selected to help you make the most of your microcomputer. You can consider the volumes of the **Encyclopedia** to be an extension of the documentation that came with your TRS-80. Each book is full of material on programming techniques, business, hardware, games, tutorials, education, utilities and interfacing.

Unlike conventional encyclopedias, the **Encyclopedia for the TRS-80** will never become stale or out of date. That's because the volumes of the **Encyclopedia** are being issued one-at-a-time, approximately six weeks apart. This means that each new volume will reflect the latest developments and discoveries, making this a living encyclopedia for TRS-80 users.

Volumes 1-7 available now. Complete set available July 1982.

ENCYCLOPEDIA FOR THE TRS-80
$19.95/volume HARDCOVER
$10.95/volume SOFTCOVER

Encyclopedia Loader

The editors at Wayne Green Books want to help you use the programs in your **Encyclopedia for the TRS-80**. So to help you maximize the use of your microcomputing time, we created **Encyclopedia Loader™**.

By a special arrangement with Instant Software™,

FREE VOLUME see details below

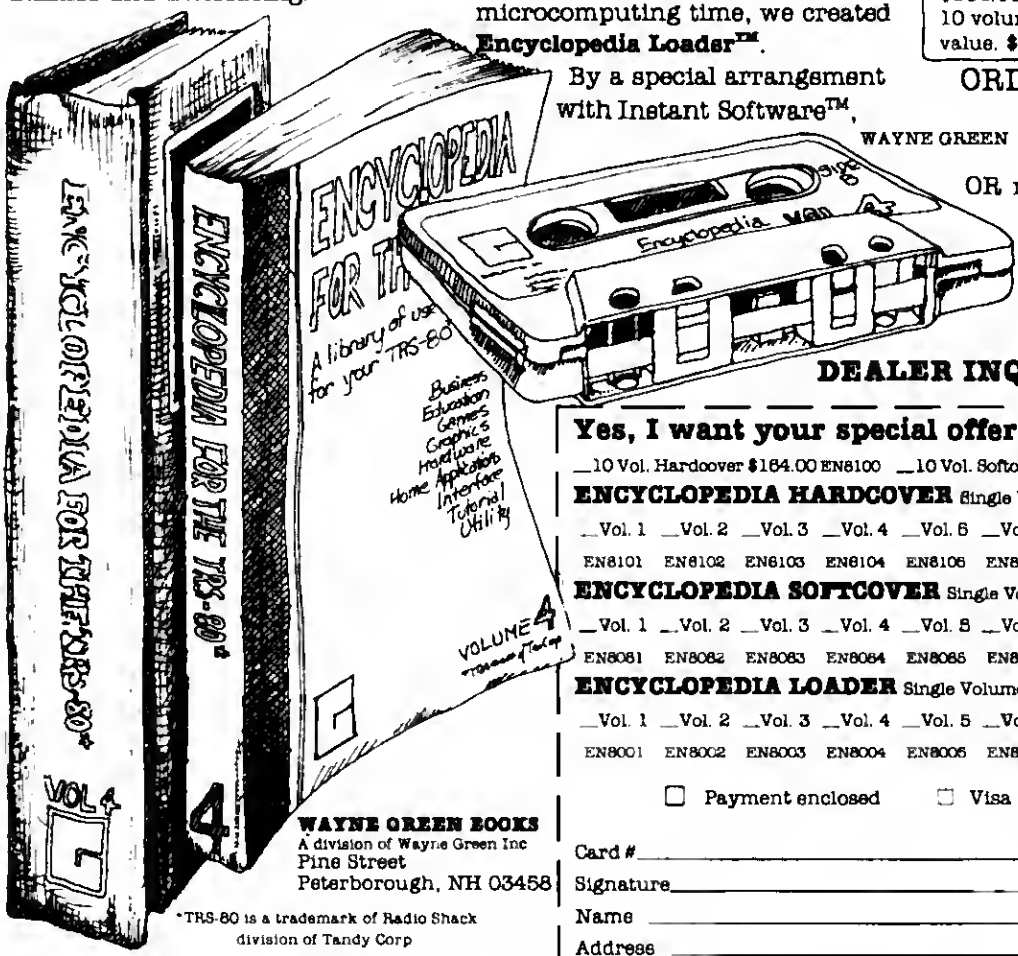
Books can now provide you with selected programs contained in each volume of the **Encyclopedia for the TRS-80** on a special series of cassettes called **Encyclopedia Loader™**. Your encyclopedia provides the essential documentation but now you'll be able to load the programs instantly

With **Encyclopedia Loader™** you'll save hours of keyboard time and eliminate the aggravating search for typos.

ENCYCLOPEDIA LOADER™
$14.95/cassette

Receive one volume FREE

If you order the entire 10 vol. set of the **Encyclopedia for the TRS-80**, you'll receive the 10th vol. FREE!
10 Volume deluxe **hard cover COLLECTOR'S EDITION**—a $199.50 value $164.00 EN8100 postpaid.
10 volume **soft cover edition**, a $109.50 value. $83.00 EN8080 postpaid.



ORDERING INFORMATION
TOLL FREE CALL
1-800-258-5473

OR mail a copy of this form or card provided to:

WAYNE GREEN BOOKS
SALES DEPT.
PINE STREET
PETERBOROUGH NH 03458

DEALER INQUIRIES INVITED

Yes, I want your special offer

__10 Vol. Hardcover $164.00 EN8100 __10 Vol. Softcover $83.00 EN8080 (UPS shipping included)

ENCYCLOPEDIA HARDCOVER Single Volume $19.95 each*

__Vol. 1	__Vol. 2	__Vol. 3	__Vol. 4	__Vol. 5	__Vol. 6	__Vol. 7	__Vol. 8	__Vol. 9	__Vol. 10
EN8101	EN8102	EN8103	EN8104	EN8105	EN8106	EN8107	EN8108	EN8109	EN8110

ENCYCLOPEDIA SOFTCOVER Single Volumes $10.95 each*

__Vol. 1	__Vol. 2	__Vol. 3	__Vol. 4	__Vol. 5	__Vol. 6	__Vol. 7	__Vol. 8	__Vol. 9	__Vol. 10
EN8081	EN8082	EN8083	EN8084	EN8085	EN8086	EN8087	EN8088	EN8089	EN8090

ENCYCLOPEDIA LOADER Single Volumes $14.95 each*

__Vol. 1	__Vol. 2	__Vol. 3	__Vol. 4	__Vol. 5	__Vol. 6	__Vol. 7	__Vol. 8	__Vol. 9	__Vol. 10
EN8001	EN8002	EN8003	EN8004	EN8005	EN8006	EN8007	EN8008	EN8009	EN8010

☐ Payment enclosed ☐ Visa ☐ MC ☐ Amex

Card #_____ MC Interbank#_____
Signature_____ Expiration date_____
Name _____
Address _____
City_____ State_____ Zip_____

*Shipping and Handling: $1.50 per item U.S. and Canada. $10.00 per item overseas airmail
Books shipped UPS with full street address.

8008

WAYNE GREEN BOOKS
A division of Wayne Green Inc
Pine Street
Peterborough, NH 03458

*TRS-80 is a trademark of Radio Shack division of Tandy Corp

The Encyclopedia for the TRS-80 is a Wayne Green publication.

Encyclopedia Loader is manufactured by Instant Software, a division of Wayne Green Inc.

Program continued

```
40040 DATA15520,15514,15508,15564,15608,15816,15880,16008,16148,
16212,16218,16224,16230,16236,16180,16056,15928,15864,15736,1568
4,15532,15526
40050 DIMDT(22):FORX=1TO22:READDT(X):NEXT
40100 DATA15838,15836,15834,15898,15980,15982,15984,15986,15988,
15918,15846,15844,15842,15840
40110 DIMBI(14):FORX=1TO14:READBI(X):NEXT
40120 DATA2,3,4,4,5,6,6,7,8,9,10,11,11,12,13,13,14,1
40130 DIMCI(18):FORX=1TO18:READCI(X):NEXT
40140 DATA2,3,4,4,5,6,7,7,8,9,10,11,12,13,13,14,15,16,16,17,18,1

40150 DIMDI(22):FORX=1TO22:READDI(X):NEXT
40160 RXTURN
40200 DATA2,3,4,6,7,9,10,11,12,13,15,16,18,1
40210 DIMBO(14):FORX=1TO14:RXADBO(X):NEXT
40220 DATA2,3,4,6,7,8,10,11,12,13,14,15,17,18,19,21,22,1
40230 DIMCO(18):FORX=1TO18:READCO(X):NEXT
40240 DATA15392,15386,15380,15493,15682,15810,15874,16002,16197,
16340,16346,16352,16358,16364,16251,16062,15934,15870,15742,1554
7,15404,15398
40250 DIMDO(22):FORX=1TO22:READDO(X):NEXT
40300 DATA15712,15708,15704,15825,15889,16024,16028,16032,16036,
16040,15919,15855,15720,15716
40310 DIMPA(14):FORX=1TO14:READPA(X):NEXT
40320 DATA15584,15579,15574,15631,15819,15883,16079,16150,16155,
16160,16165,16170,16133,15925,15861,15665,15594,15589
40330 DIMPB(18):FORX=1TO18:READPB(X):NXXT
40340 DATA15456,15450,15444,15400,15605,15813,15877,16005,16202,
16276,16282,16288,16294,16300,16246,16050,15931,15867,15739,1554
2,15468,15462
40350 DIMPC(22):FORX=1TO22:READPC(X):NEXT
40390 DATA131,131,131,140,140,140,140,140,140,140,131,131,131,13
1
40400 DIMRP(14):FORX=1TO14:READRE(X):NXXT
40450 RETURN
40500 DATA15832,15831,15896
40510 DIMBl(3):FORX=1TO3:READBl(X):NEXT
40520 DATA140,176,131
40530 DIMCl(3):FORX=1TO3:READCl(X):NEXT
40540 DATA15840,15849,15912
40550 DIMDl(3):FORX=1TO3:READDl(X):NEXT
40560 DATA15701,15700,15763,15762,15761,15825,15889,15954,15955,
15956,16021
40570 DIMB2(11):FORX=1TO11:READB2(X):NXXT
40580 DATA140,176,131,140,176,191,191,131,140,176,131
40590 DIMC2(11):FORX=1TO11:READC2(X):NEXT
40600 DATA15723,15724,15789,15790,15791,15855,15919,15982,15981,
15984,16043
40610 DIMD2(11):FORX=1TO11:READD2(X):NEXT
40620 DATA15569,15568,15631,15630,15629,15692,15691,15755,15819,
15883,15947,16011,16012,16013,16078,16079,16080,16145
40630 DIMB3(18):FORX=1TO18:READB3(X):NEXT
40640 DATA144,176,131,144,176,131,188,191,191,191,191,131,140,17
6,131,140,176,131
40650 DIMC3(18):FORX=1TO18:READC3(X):NEXT
40660 DATA15599,15600,15665,15666,15667,15732,15733,15797,15861,
15925,15980,16053,16052,16051,16114,16113,16112,16175
40670 DIAD3(18):FORX=1TO18:READD3(X):NEXT
40680 DATA15436,15435,15498,15497,15496,15559,15558,15557,15621,
15685,15749,15813,15877,15941,16005,16069,16134,16135,16136,1620
1,16202,16203,16268
40690 DIMB4(23):FORX=1TO23:READB4(X):NEXT
40700 DATA140,176,131,140,176,131,140,176,191,191,191,191,191,19
1,191,191,131,140,176,131,140,176,131
40710 DIMC4(23):FORX=1TO23:RXADC4(X):NEXT
40720 DATA15476,15477,15542,15543,15544,15609,15610,15611,15675,
15739,15803,15867,15931,15995,16059,16123,16186,16185,16184,1624
7,16246,16245,16308
40730 DIMD4(23):FORX=1TO23:READD4(X):NEXT
40740 RETURN
40780 DATA4,3,2,2,3,4,4,3,2,2,3,4
40785 DIMT2(12):FORX=1TO12:READT2(X):NEXT
40790 DATA2,2,2,1,1,1,22,18,14,13,17,21
40795 DIMS2(12):FORX=1TO12:READS2(X):NEXT
40800 DATA2,2,2,2,2,2,2,2,2,2,2,2
40810 DIMT3(12):FORX=1TO12:READT3(X):NEXT
40820 DATA4,3,2,14,13,12,11,10,9,7,6,5
40830 DIMS3(12):FORX=1TO12:READS3(X):NEXT
40840 DATA2,2,2,2,3,3,3,3,4,4,4,4
40850 DIMT4(12):FORX=1TO12:READT4(X):NEXT
40860 DATA1,12,8,5,1,15,10,6,1,10,12,7
40870 DIMS4(12):FORX=1TO12:READS4(X):NEXT
40880 DATA4,4,4,4,4,4,4,4,4,4,4,4
40890 DIMT5(12):FORX=1TO12:READT5(X):NEXT
40900 DATA9,20,8,19,7,18,6,17,5,16,4,15
40910 DIMS5(12):FORX=1TO12:RXADS5(X):NEXT
40920 DATA4,4,4,4,4,4,4,4,2,3,2,3
40930 DIMT6(12):FORX=1TO12:RXADT6(X):NEXT
40940 DATA4,3,2,1,22,21,20,12,1,1,8,16
40950 DIMS6(12):FORX=1TO12:RXADS6(X):NEXT
40960 DATA4,4,4,4,3,3,3,3,2,2,2,2
40970 DIMT7(12):FORX=1TO12:READT7(X):NEXT
40980 DATA7,6,18,17,6,5,15,14,5,4,12,11
40990 DIMS7(12):FORX=1TO12:READS7(X):NEXT
41000 DATA4,3,4,3,4,3,4,3,2,2,2,2
41010 DIMT8(12):FORX=1TO12:READT8(X):NEXT
41020 DATA4,4,9,7,15,13,20,16,5,4,12,11
41030 DIMS8(12):FORX=1TO12:READS8(X):NEXT
41300 DATA4,2,4,2,4,2,4,2,4,3,4,3
41310 DIMT9(12):FORX=1TO12:RZADT9(X):NEXT
41320 DATA22,6,21,5,20,4,15,3,14,10,13,1
41330 DIMS9(12):FORX=1TO12:READS9(X):NEXT
45000 RETURN
```

AMERICAN

118 SO. MILL ST
PRYOR, OK 74361
(918) 825-4844

SMALL BUSINESS COMPUTERS

ALL PRICES ARE CASH DISCOUNTED 3%. C.O.D. AND CHARGE ORDERS ARE 3% MORE.
RETAIL LOCATION: 447 S. WOOD, PRYOR, OKLAHOMA 74361

DISCOUNT PRINTERS

EPSON—CALL FOR PRICES

OKIDATA
MICROLINE 80.....$350
MICROLINE 82A.....$469
MICROLINE 83A.....$719
MICROLINE 84.....$1015

C. ITOH
PROWRITER.....$499
F10-40.....$1450
F10-55.....$1750

Paper, Ribbons and Other Accessories are also available

224

NEW from

Synware Games

Hypergate

Series

UNDENIABLY THE BEST SCIFI
Others only dream of such programming, we make it a reality!

HYPERGATE CENTURION - A totally original "Real Time" simulation overflowing with superb action sound & graphics. A 100% machine code masterpiece with **everything** you wanted in a SciFi game: space monsters, marauding pirates, military skirmishes, your own fleet of patrol ships, dazzling explosions, startling graphics, multiple skill levels, and much, much more. (16K System tape)

HYPERGATE PATROL - A fantastic spinoff from Hypergate Centurion with excellent sound & graphics. Command a hypergate patrol ship and navigate the Hypergates of the Local Super Cluster in search of danger. (16K Basic tape stop action strategy)

Both games on one cassette

$39.95

Ask your dealer for **Synware Games**, or order from us. The games are compatible with the TRS-80 model I or III. Specify 16K Level II compatible versions or 32K Disk compatible versions on cassette (user transfers from cassette to disk).

Postage paid in USA & Canada. Foreign orders add $2.00 for postage. COD orders $3.00 extra. Florida residents add 4% sales tax.

Send check or money order to:
Synergistic Solar, Inc.
P. O. Box 560595
Miami, Florida 33156

We have a full line of top notch games. For free catalog mail us a postcard or letter.

DEALER INQUIRIES MOST WELCOMED
TRS-80 is a trademark of Tandy Corp.

ARCADE FAVORITES

• ALL GAMES WRITTEN IN M/C CODE FOR FAST REAL TIME GRAPHICS WITH SOUND. • SUIT TR-80 MODEL I & III OR PMC-80. • ALL GAMES 2 PLAYERS WITH TOP 10 SCORES. • ALL GAMES LOCATED 5200H OR HIGHER WITH NO LOADER TO FACILITATE EASY PLACEMENT ON DISK.

ALL GAMES $16.95 each.

KILLER BEETLES
Dig traps to catch and bury the Killer Beetles. But be quick or they'll catch you.

SPACE SHOOTOUT
Here it's human against human. Each player controls a ship and tries to blast through a meteorite belt and hit his opponent.

JUNGLE RAIDERS
Protect your barrels and stop your base from being dragged off by scavenging Jungle Raiders.

MAKE ALL CHECKS AND MONEY ORDERS PAYABLE TO: **DUBOIS AND McNAMARA.**
POST TO: 495 ELLIS, SUITE 356
SAN FRANCISCO, CA 94102-1996

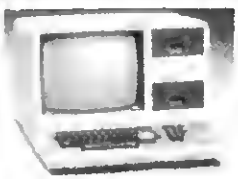
DEALER INQUIRIES WELCOME (415) 441-3080

See List of Advertisers on page 336

Table 1. Loco Motion Program Description

LINE NUMBERS	FUNCTION
50-80	Initialize
150-220	1st screen & data read
250-320	2nd screen & data read
350-370	3rd screen & data read
400-420	4th screen & data read
600	Select pattern
700	Setup for play
900	Play
1010-1080	Start units
3000-3130	Mstr move ctl
3000	Add 1 to active unit
3002	Alternate odd and even
3004	Clear left, right, slow, and fast controls
3010	Odd or even key reads
3020	Clear movement phase controls
3030	Slow=fast or not slow=not fast=normal
3040	Fast P3+P1+P2=non 0
3050	Normal P1+P2=non 0
3060-3070	Left=right or not left=not right=straight
3080-3085	1st move phase(P2) a "1" = left(inside)
3090-3095	1st move phase(P2) a "2" = straight
3100-3105	1st move phase(P2) a "3" = right(outside)
3110-3115	2nd move phase(P1)a"1"=straight "0"=no move
3120-3130	3rd move phase(P3)a"1"=straight "0"=no move
4100-4200	Odd units key read
4110	W & R
4120	S
4140	E
4150	A
4160	Q & F
4170	C
4190	Z & X
5000-5100	Even units key read
5010	I & O
5020	J & K
5030	L
5040	M
5060	P
5080	;
5090	, & .
6000-7040	Move left(inside)
6000	Set queue ctr
6010	Move old address into queue
6020	Increment position
6030	Old track branch vector
6031	Already in infield
6032	Moving to infield
6033	Moving middle to inside track
6034	Moving outside to middle track
6035	Inside move cannot be to outfield
6038	Calc new track and store in queue
6040	New track branch vector
6041	Move to infield
6042	Move to inside
6043	Move to middle
6090-6095	Store new position address in queue
6100	Occupied? If no goto 7000
6110	If track not infield goto 6200
6120-6130	Go till an open infield position is found
6200	Increment queue cntr & identify bumped unit
6210	Loop back with new unit
7000-7010	Go backward through queue moving each unit
7020-7040	Advance unit routine
8000-8060	Move straight
8010	Increment position number
8020	Track branch vector
8021	In infield
8022	Inside track
8023	Middle track
8024	Outside track
8025	In outfield
8030	No advance if blocked
8040	Prepare for advance
8050-8060	Advance unit
9000-10040	Move right (outside)
9000	Set queue counter
9010	Store old address in queue
9020	Increment position number
9030	Old track branch vector
9031	Infield to inside track
9032	Inside to middle track
9033	Middle to outside track
9034	Outside to outfield
9035	Already in outfield
9039	Calc new track and store in queue
9040	New track branch vector
9041	Cannot move out to infield

FREE SHIPPING

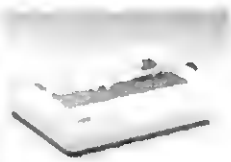


TRS®-MOD III
48K, 2 TANDON DISK DRIVES
(No. RS 232)
$1750

RS232 $150
Instructions Included

TRS 80®-MOD III Disk Controller
Includes Disk Controller, Power Supply, Mounting Hardware, Cables and Instruction Manuals
$279 COMPLETE

PRINTERS

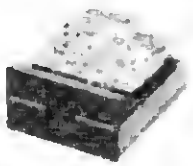


MX80 $425
MX80F/T 510
MX100 675
C. ITOH COMET I 290

Printer Cable $26.95
($20 w/purchase of printer)

TANDON DISK DRIVES

TM100-1 Single 40 Track Drive $210
TM 100-2 Double 40 Track Drive $330
TM 100-3 Single 80 Track Drive $330
TM 100-4 Double 80 Track Drive $425



16K MEMORY KIT $15
($10 with purchase over $200)

VISA, MASTERCARD ($100 Min.)
Or Certified Check
90 Day Warranty (Parts & Labor)
TRS 80 is a Registered Trademark, Tandy Corp.
Prices Subject to Change Without Notice

DATA—MAIL
19205 Parthenia St.
Northridge, CA 91324

FREE SHIPPING IN CONTINENTAL U.S.
(TRS 80 MOD III EXCEPTED)
(213) 993-4804

452

```
9042          Move to inside track from infield
9043          Move to middle track from inside
9044          Move to outside track from middle
9045          Move to outfield from outside track
9050          Store new positions in queue
9051          Won't move from infield if position filled
9052          Test - track and not outfield
9060-9070     Go till an open outfield position is found
9100          Increment queue cntr & identify bumped unit
9110          Loop back with new unit
10000-10010   Go backwards thru queue moving units
10020-10040   Advance units
11000-11110   Advance units on screen
11010-11031   New display position
11011         Infield
11012         Inside
11013         Middle
11014         Outside
11015         Outfield
11030         Display left & right parentheses()
11031         Display unit number
11060-11110   Clear old display
11061         Infield
11062         Inside
11063         Middle
11064         Outside
11065         Outfield not cleared
11070         Clear 3 character unit display
11100         Increment score counter
11110         Repair infield
15000-15060   Test against target
20000-20999   Screen number one
21000-21999   Screen number two
22000-22999   Screen number three
23000-23999   Screen number four
24000-24020   Special inkey routine
26015-26120   Select pattern
26130-26240   Load patterns
26250         Draw borders routine
26260-26310   Draw target pattern
26500         Draw borders   Do it yourself
26510-26630   Show positions
28000-28160   Draw borders routine
28200-28260   Draw target patterns
28500-28570   Draw track map
40000-40001   Data arrays
40010-40021   Inside track addresses
40030-40041   Middle track addresses
40050-40101   Outside track addresses
40110-40120   Infield track addresses
40130-40140   Middle to inside transfer
40150-40200   Outside to middle transfer
40210-40220   Inside to middle transfer
40230-40241   Middle to outside transfer
40250-40301   Outfield addresses
40310-40321   Inside track pattern addresses
40330-40341   Middle track pattern addresses
40350-40390   Outside track pattern addresses
40400-40500   Infield repair characters
40510-40520   Left infield border addresses
40530-40540   Infield border characters
40550-40560   Right infield border addresses
40570-40580   Left inside border addresses
40590-40600   Inside border characters
40610-40621   Right inside border addresses
40630-40641   Left middle border addresses
40650-40661   Middle border characters
40670-40681   Right middle border addresses
40690-40701   Left outside border addresses
40710-40721   Outside border characters
40730         Right outside border addresses
40740-40780   Pattern track and positions
40785-40790   Pattern 2 track
40795-40800   Pattern 2 position
40810-40820   Pattern 3 track
40830-40840   Pattern 3 position
40850-40860   Pattern 4 track
40870-40880   Pattern 4 position
40890-40900   Pattern 5 track
40910-40920   Pattern 5 position
40930-40940   Pattern 6 track
40950-40960   Pattern 6 position
40970-40980   Pattern 7 track
40990-41000   Pattern 7 position
41010-41020   Pattern 8 track
41030-41300   Pattern 8 position
41310-41320   Pattern 9 track
41330-45000   Pattern 9 position
```


Introducing low cost, TRS-80 compatible disk drives

Up to *one megabyte* for Models I and III

Low Cost Storage

Model III Internal Drives

- single sided, 40 tracks with 250K $215
- double sided, 40 tracks with 500K $335
- double sided, 80 tracks with 1000K $435

Model I and III External Drives

(Includes disk drive, power supply, cable and color coordinated cabinet)

- single sided, 40 tracks with 250K $315
- double sided, 40 tracks with 500K $435
- double sided, 80 tracks with 1000K $535

External and internal mounting

Now you can have up to one megabyte of unformatted storage for your TRS-80 Model I or III. Drives can be mounted internally or externally on the Model III and externally on the Model I.

Eight color cabinets to choose from

Cabinets for external mounted drives are available in black, chrome, off-white, lime green, dark green, bright orange, computer blue, and brilliant yellow.

Unconditional warranty and service

90-day unconditional warranty plus service center for out-of-warranty service.

For more information on the TRS-80 compatible disk drives, call or write:

I² INTERFACE, INC.
7630 Alabama Ava., Unit 3
Canoga Park, CA 91304
(213) 341-7914

Dealer and quantity discounts available upon request. MasterCard, VISA or COD orders accepted. TRS-80 is a registered trademark of Tandy Corporation.

182

See List of Advertisers on page 338

Action without thinking.

Intellectual Somnambulism

M. Keller
13423 Desert Hills NE
Albuquerque, NM 87111

With many simulation games it's hard for the operator to identify in a visual and tactile way with the action of the game. Some programs, in fact, provide little involvement of the senses at all, and the simulation is more an exercise in mathematics. These games can be challenging, but how about those times when we like to "get in on the action?"

Rammer is a short program written to show the other end of the spectrum—a fast-moving action game that combines animated graphics with natural motor responses.

Running The Program

Written for a 16K Level II TRS-80, Rammer includes a 12 byte machine language routine. To protect it from being overwritten by Basic, answer the memory size prompt with 32754. If you are running under Disk Basic with 32K, change lines 100, 180, and 320 to read:

```
100 DEFUSR0 = &H8FF4
180 X = USR0(X)
320 B = &H8FF4 : FOR X = B TO B + 11
```

and answer the memory size question with 49140.

When the program is run, the Rammer (character A) appears in the center of the screen. At the same time, the enemy squadron appears at the top of the screen and begins to move down towards the Rammer. The object of the game is to intercept and ram as many enemy ships as possible, using the left and right arrow keys for control.

Any time the Rammer is being moved, a trail is left behind it. When a hit is made, the enemy ship disintegrates and its debris scrolls down the screen while the operator goes after the next likely target. Occasionally, a group of enemy ships will line up diagonally as they approach. It's really exciting to "wipe out" three or four of these at a time, and equally frustrating when you zip too far to the left or right and miss them all.

Each hit reduces the size of the enemy fleet so that fewer ships approach. During the action, the number of hits and misses is continuously displayed at the bottom of the screen.

Programming Features

Since Rammer is a real-time action sequence, the program is optimized for speed. This is done in several ways: first, all variables are defined as integers, and most of the values needed by the program are assigned to variable names early, even if they remain constant during running. This increases

The Key Box

Basic Level II
Model I
16K RAM

Variable Name	Initial Value	Purpose
H	0	Current total number of collisions (hits).
HM	0	Home position on screen, used in line 130.
KB	14400	Keyboard address where left and right-arrow keys are PEEKed.
LE	15938	Left Edge: Leftmost screen position allowed for the Rammer
LT	32	Used in comparison with the value found at KB in line 250 to determine if left arrow is being pressed.
M	0	Number of Misses: incremented in line 150 each time a new enemy ship is created. Decremented only in line 300 following a hit. Displayed by line 130.
N	63	Used as a base number for random statement in line 150. Incremented by line 300 following a hit. As N grows, it becomes less likely that RND(N)-1 will return a valid position on the top line of the screen. This thins out the enemy fleet.
P	0	Position for next enemy ship to be displayed.
R	65	The Rammer. ASCII code 65 is character "A". It is POKEd to Rammer Position, RP, by line 280.
RE	15998	Right Edge: rightmost screen position allowed for Rammer.
RP	15968	Rammer Position: starts at address 15968 (middle of screen) and may be increased or decreased by lines 220 or 250. Immediately following a scroll, line 280 checks for a space at RP. If a space is present, there has been no collision.
RT	64	Same use as LT, except for right-arrow pressed.
TR	46	Trail left behind Rammer. 46 is ASCII code for a period.
X	0	Defined in line 60 to speed up execution of USR statement in line 180.
CD$		Collision Debris String: placed on screen by line 300 as replacement for enemy ship following collision.
CL$		Clear Line String: used in line 130 to clear top screen line before creating next enemy ship.
ES$		Enemy Ship String: consists of character "Y" surrounded by quotes.

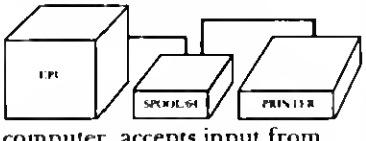
Table 1. Variables

How many times must your TRS-80 stop just to talk to your printer?

Your computer talks faster than your printer can listen. Expensive time is lost forever. SPOOL/64, a 64k byte hardware print spooler, keeps your computer processing while your printer is printing. No more waiting. No more wasting.

SPOOL/64 buffers your print output and transmits the information to your printer at the printer's specific print rate. It buffers up to 13 minutes of print output (at 80 characters per second).

SPOOL/64 plugs directly into both your printer and



computer, accepts input from parallel centronics cables (serial RS-232 available soon), and its user programming feature allows you to download your own programs so SPOOL/64 can handle sophisticated print routines. And SPOOL/64, used with your software spooler, can give you the highest performance spooling available.

SPOOL/64 utilizes 64k of dynamic RAM, a Z-80 CPU, a 2716 ROM and a copy of the source program for the object code in the ROM is included.

SPOOL/64, priced at just $399, is the most cost/effective print spooler on the market. Evaluate performance. Evaluate price. Then let SPOOL/64 get your computer hack talking to you. Call or write Apparat today for a free brochure. Dealer inquiries invited.

VISA

Apparat, Inc.

40 4401 So. Tamarac Parkway, Denver, CO 80237 (303) 741-1778

"ON GOING SUPPORT FOR MICROCOMPUTERS"

COLOR COMPUTER
16K Extended BASIC

GRAPHICS CHARACTER SET $12
- Upper/Lower Case
- Machine Language Subroutine
- Use in 8 Graphics Modes
- Uses BASIC String Variables
- Design your own Characters

FULL FEATURE MONITOR $ 6
FORTH (32K + Cassette) $15

KIDS CORNER – Kid Tested!!

FLASH CARDS (Over 1000 Words) $12
NAME THAT TUNE (1 2 Player) $ 6
KID STUFF 1 (Ages 4 and up) $ 6
KID STUFF 2 (Ages 5 and up) $ 6
Send for details

FORTHRIGHT SOFTWARE
273 Connecticut Ave
Newington Ct 06111 ✓402

96K model 1

Protect your investment and enhance operation. Replace old 16K RAMS with new 64K dynamic RAMS and a BIGMEM memory controller. Features include:
- 64K keyboard with 48K on power-up
- plus 2K RAM above ROM if desired.
- Up to 96K with 32K E/I connected.
- Remaps kybd and video for CP/M*
- Adds reliability to clock speedup
- Installs neatly within kybd case.
- No increase in power consumption.

Introductory price.....$180 complete (64K DRAMS, A&T BIGMEM controller, internal cable/connector, detailed instructions and ppd. shipping). NY residents add 7% sales tax. Send check or money order to:

MICROHATCH
P.O.Box 501
DeWitt, N.Y. 13214

* Trademark of Digital Research ✓419

TRS-80 COLOR COMPUTER

SPACEFLY: $15.95
Pilot your space shuttle through mysterious, hostile worlds. Ten skill levels.

MINEMOANT: $15.95
Blast out of a plasma prison and dock with the mother ship before it is too late.

DOOMSDOOM: $15.95
Hordes of alien attack vessels plot to destory the Earth.

MEGABYTE: $15.95
A large assortment of fully documented machine code subroutines and basic programs.

Buy two or more and get 20% off!

All programs require 16K Ext. Basic or larger.
UNIVERSAL SOFTWARE
P.O. Box 748
Roseville, MI 48066 ✓423

TRW, CBI & affiliates
CREDIT REPORT
program for TRS-80 & CP/M

for only **$99.95** ppd.

You don't have to worry about making mistakes. Type input at your own speed, correct, then send.
- Prompted input w/ field size
- Can edit input information change, insert & delete char.
- Stores input for sending later
- Subscriber's #s are stored in program for auto sign on.
- Credit info is stored in RAM for display and print later

Send $99.95 check or money order w TRW & CBI subscriber # & complete hardware list to
HON FINANCE & INSURANCE COMPUTERS
PO Box 23825, Pleasant Hill, CA 94523
(415) 680-7888 ✓421 THANK YOU

ABSOLUTE DISK I/O
FOR MODEL III
MON83

Features of MON83:
- Hex and Ascii Display of Memory
- Dissassembler
- Single and Double Density Sector Read and Write
- Go, with Breakpoints

SEND CASH OR CHECK FOR $29.95 PLUS $2.00 FOR SHIPPING AND HANDLING TO:

ROCO SOFTWARES
3 Martin Court
Johnson City, TN 37601 ✓429

SCHEDULE MINDER AN INNOVATIVE CONCEPT IN TIME MANAGEMENT

COMMUNICATE WITH YOUR COMPUTER IN ENGLISH NO PROGRAMMING KNOWLEDGE NEEDED

SCHEDULE MINDER is a tested projected time and record management program for the TRS80 I II or III One disk drive minimum

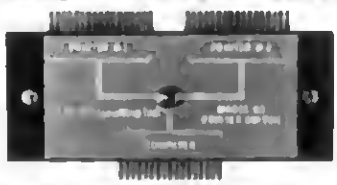
SCHEDULE MINDER provides the user with the ability to manipulate data by date, context area code, specific subject or any user predetermined code
- Self prompting menu controls
- Extensive error trapping
- Alerts seven days in advance
- Confidential files restricted by coding
- Client records
- User friendly
- Sales leads
- Legal contracts
- Correspondence
- Card files
- Personnel records
- Mailing lists
- Automatic name and address management

SCHEDULE MINDER has been tested extensively and includes a comprehensive user manual Send $5.00 for instruction manual applicable to purchase of system Complete system on disk $79.00

Mail order using bank check money order or personal check Please allow two weeks to clear New York City residents include 8¼% sales tax Mail to

HALRAD ASSOCIATES LTD.
1015 EAST 35th STREET
BROOKLYN, NEW YORK 11210 ✓426

TRS-80 MODEL I & III USERS!



Now you can have 2 printers on line at all times. Our MODEL 80 LINE PRINTER SWITCH is designed specifically for the TRS-80 computer to allow the user to easily select between two printers by means of a conveniently located switch without changing cables. Our compact module connects to the printer port of your TRS-80 Model I or Model III through any reasonable length printer port extension cable and provides an edge connector for each of your two printers. Gold plated contacts ensure excellent connection reliability and ends the problem of constantly plugging and unplugging printer cables. And, it works with any type of printer that could normally be connected to a TRS-80 printer port. Our Model 80 switch comes assembled, tested and ready to use. A printer port extension cable is available from your local dealer or may be purchased separately from us at $12.50 for an 18" extension. See your local dealer or call or write now for more information. ✓409

hf signalling inc.

Administrative and Engineering Offices P.O. Box 17510 Kansas City, MO 64133 phone (816) 561-4448

Leaders
Games
Pins
Handicaps
Blind Scores
Teams
Players

BOWLING LEAGUE STATISTICS

High Game
High Series
Lanes
Substitutes
Points
Averages
Scratch

For the TRS-80*

BOWLSTAT 2.0 will generate team standing sheets suitable for posting with full team and player statistics, and also prints league scoring sheets A wide range of handicapping and scoring options meets almost any league's requirements Entry of weekly scores is fast and simple with extensive prompting and error detection

On Diskette with User's Manual for the Model I, II or III
$79.95

Manual Only
(Deductible on purchase of Diskette)
$9.95
Pa. residents add 6% Sales Tax

Datascore
P. O. Box 995, Sharon, Pa. 16146
✓438 *Trademark of Tandy Corp

Mayday

MAYDAY means **HELP** and here it is. . .

*TRS-80 Programming

HELP utility program for your NEWDOS-80 disk help command returns a mini-page display of the manual for mod I and mod III . disk $18

ADR auto density recognition program lets you put mod I discs in and get an automatic p-drive setup... makes it quick and easy disk $15

COMPACTOR mod I or mod III disc compactor program... gets the most out of each of your discs $15

LISTR reads compacted programs and gives hard copy listing in an expanded and super legible format... disc $15

Get all four of the above on one disk for $45

QCDATA process control analysis gives statistical results on screen and a hard copy report for quick and accurate verification... mod III, level II disc or cassette $150

WGHTCAL compute part weight from blueprints by geometric definition . was developed for use in the plastics industry, but could be modified for other uses gives a hard copy report of the results and methods used . mod. III, level II disc or cassette $250

Send check or money order only...
add $1.50 for shipping... Wis. residents add 4% tax

Mayday SOFTWARE
Post Office Box 66, Phillips, Wisconsin 54555
715-339-3966

*tm TANDY corp
tm APPARAT, inc ✓407

execution speed, because Basic can look up a value in its variable table faster than it can interpret a constant value each time it encounters one.

The second speed feature is a short machine language routine (Program Listing 1) that does a reverse scroll of the screen. That is, all characters move *down* one line instead of the normal upward scroll seen while Listing a Basic program. Reverse scrolling allows the Rammer's environment to move past it from the top to the bottom of the screen, giving the operator a natural illusion of motion. The bottom line, used for scoring, is not scrolled.

Liberal use is made of POKE, rather than PRINT@ statements to display objects on the screen. Keyboard scanning for operator input is done with PEEK instead of INKEY$. This makes it unnecessary to hit the same key repeatedly for continued movement in one direction (a popular but distracting characteristic of some games). As long as the right-arrow key is depressed, the Rammer will continue to move to the right. Releasing the key stops the Rammer's movement. It's like a "poor man's joystick." For an excellent article on keyboard scanning with PEEK, see "Keyboard Interrogation"; *80 Microcomputing*, June 1980.

Of course, there is a price tag on any optimization for speed; the program listing is not as easy to analyze. For easier tracking of the variables used in Rammer, refer to Table 1. The program is heavily commented also and the remark lines contain the algorithm for the action (see Program Listing 2).

Customizing Ideas

Rammer can be used as is, but with a little imagination, you can do more with it. Here is some food for thought:

- Have the program occasionally generate a super enemy ship which can damage or destroy the Rammer with a hit.
- Incorporate other keys in the keyboard scan. For example, use the up-arrow to fire a missile.
- The scoring routine is intentionally primitive and can be altered. For example, scoring could be weighted according to the amount of maneuvering done by the operator, with penalties for failure to move the Rammer.
- If you have a fairly fast sound-generating routine, some noise could accompany a hit.
- Use the entire program as a subroutine in your favorite version of Startrek to provide an occasional change of pace in the action.
- If the addition of features causes speed to become critically slow, take out all remarks, initialize all constants as variables at the beginning of the program, and use multiple-statement lines wherever possible.

Even Mikie Likes It

Because Rammer's visual orientation is natural and the responses to keyboard input are immediate, the program allows good hand/eye coordination. Even small children can use it right away, once you show them the left- and right-arrow keys (be prepared to forfeit your rights to the computer for a while, mom and dad). Younger ones may find it easier to evade as many enemy ships as possible, instead of attacking. It's just as much fun.

Probably because we are raised with motion pictures and television, we have become a generation accustomed to realistic visual illusions, but displaying simulated motion on a computer screen is tricky business. Rammer illustrates at least one fairly simple alternative. ■

```
10 'RAMMER        M. KELLER   (505) 294-4966    JANUARY 1981
20 '
30 CLS:GOSUB 320   'POKE MACHINE LANGUAGE SCROLL ROUTINE
40 '----------------- INITIALIZE VARIABLES -------------------
50 CLEAR200:DEFINTA-Z:R=65:P=0:XB=14400:LT=32:RT=64:HM=0:TR=46
60 M=0:H=0:X=0:RP=15960:N=63:LE=15938:RE=15996:CL$=CHR$(30)
70 ES$=CHR$(34)+"Y"+CHR$(34)   'ENEMY SHIP
80 CD$=":* *:"    'COLLISION DEBRIS
90 'DEFINE ENTRY POINT FOR USR CALL (REVERSE SCROLL)
100 POKE 16526,243: POKE 16527,127
110 PRINT@965,"ENEMY SHIPS HIT:              ENEMY SHIPS MISSED:";
120 '---------- SHOW NEXT ENEMY SHIP AND SCROLL DOWN ----------
130 PRINT@M,CL$;:PRINT@1014,M;  'CLEAR THE TOP LINE
140 'IF RND(N)-1 IS ON TOP LINE, PRINT AN ENEMY SHIP THERE
150 P=RND(N)-1:IFP>60THEN 170 ELSE PRINT@P,ES$;:M=M+1
160 'ERASE RAMMER SO IT WON'T SCROLL DOWN WITH REST OF SCREEN
170 POKE RP,32
180 X=USR(X)    'MOVE SCREEN DOWN 1 LINE
190 '-------------------- SCAN KEYBOARD ------------------------
200 ' IF RIGHT ARROW PRESSED AND RIGHT SCREEN EDGE NOT REACHED,
210 ' THEN SHIFT RAMMER POSITION 2 SPACES RIGHT & LEAVE TRAIL
220 IFPEEK(KB)=RT AND RP<RE THEN RP=RP+2:POKERP+63,TR
230 ' IF LEFT ARROW PRESSED AND LEFT SCREEN EDGE NOT REACHED,
240 ' THEN SHIFT RAMMER POSITION 2 SPACES LEFT & LEAVE TRAIL
250 IFPEEK(KB)=LT AND RP>LE THEN RP=RP-2:POKERP+65,TR
260 '------------------ COLLISION PROCESSING -----------------
270 'IF THERE'S NO COLLISION, RESTORE RAMMER AND CONTINUE
280 IFPEEK(RP)=32 THEN POKE RP,R:GOTO130
290 'COLLISION!   DISPLAY DEBRIS BEHIND THE RAMMER AND CONTINUE
300 H=H+1:M=M-1:N=N+1:PRINT@RP-15362,CD$;:PRINT@981,H;:GOTO130
310 '-------------- MACHINE CODE FOR REVERSE SCROLL ------------
320 FORX=32755 TO 32766
330 READ Y:POKE X,Y:NEXT X:RETURN
340 DATA 17,191,63,33,127,63,1,128,3,237,184,201
```

Program Listing. Rammer

```
                00420 ; DOES REVERSE SCROLL OF SCREEN. LEAVES LINE 16
                00425 ; INTACT. THIS ROUTINE IS BUILT INTO THE BASIC PRO-
                00427 ; GRAM, AND IS SHOWN HERE FOR CLARIFICATION.
                00428 ;
0000 113F3F     00430   LD      DE,16319  ;DEST. = LAST OF LINE 15
0003 213F3F     00440   LD      HL,16255  ;SOURCE = LAST OF LINE 14
0006 018003     00450   LD      BC,896    ;NO. OF CHAR'S TO MOVE
0009 EDB8       00460   LDDR              ;REVERSE SCROLL 1 LINE !
000B C9         00465   RET               ;BACK TO BASIC
0000            00470   END
00000 TOTAL ERRORS
```

Program Listing 1

Design Line Micro Work Stations

- A complete range of work stations designed specifically to house *all* micro-computers.
- Delivered heavily packed, in self-assembly form needing only a Phillips screwdriver and a few minutes of your time to assemble.
- Manufactured from 1" all wood particle board surfaced with hard-wearing melamine veneer, in Oak or Walnut.
- Storage stand shown is an additional option
- Dealer and Distribution prices on request.
- For more information on our full range of work stations write or call 301-223-8900.

ATLANTIC CABINET CORPORATION
P. O. Box 100, Williamsport, Maryland 21795 ↩538

↩See List of Advertisers on page 338

Lead a dull life? Do we have a game for you!

Stanley

Program Listing

```
1 REM    STARE DOWN   WITH   STANLEY
2 REM    By   Dave and Keith Black
3 REM         1965 Sequoia Dr.
4 REM         Idaho Falls, ID.  83401
10 CLEAR600:B$=CHR$(24):A$=CHR$(25):D$=CHR$(26)
:U$=CHR$(27)
20 F$(1)=A$+CHR$(176)+CHR$(140)+CHR$(134)
+STRING$(3,131)+U$+STRING$(21,176)+D$+STRING$(3,131)
+CHR$(137)+CHR$(140)+CHR$(176)+D$+CHR$(149)+D$+B$
+CHR$(130)+CHR$(148)+D$+B$+CHR$(149)+D$+B$+CHR$(133)
+B$+B$+CHR$(160)+D$+B$+CHR$(149)+D$+B$+CHR$(129)
30 F$(1)=F$(1)+B$+B$+CHR$(152)+D$+B$+B$+CHR$(134)+B$
+B$+CHR$(176)+D$+B$+B$+CHR$(131)+B$+B$+CHR$(140)+B$
+B$+CHR$(176)+D$+B$+B$+CHR$(131)+B$+B$+CHR$(140)
40 F$(2)=D$+CHR$(170)+D$+B$+B$+CHR$(160)+CHR$(129)+D$
+B$+B$+CHR$(170)+D$+B$+CHR$(130)+CHR$(144)+D$+B$
+CHR$(170)+D$+B$+CHR$(130)+CHR$(164)+D$+CHR$(137)
+CHR$(176)+D$+CHR$(131)+CHR$(140)+CHR$(176)+D$
+CHR$(131)+CHR$(140)
50 F$(2)=F$(2)+STRING$(7,176)+D$+STRING$(3,131)+U$
+STRING$(7,176)
60 F$(3)=STRING$(4,D$)+STRING$(17,A$)+CHR$(191)+D$
+B$+CHR$(191)+D$+B$+B$+CHR$(184)+CHR$(191)+CHR$(180)
+STRING$(5,A$)+D$+CHR$(176)+CHR$(132)+STRING$(17,B$)
+CHR$(136)+CHR$(176)+D$+STRING$(13,131)
70 PU$=CHR$(174)+CHR$(183)+CHR$(187)+CHR$(157)
80 E$(1)=STRING$(2,D$)+STRING$(5,A$)+STRING$(2,176)
+STRING$(5,140)+CHR$(164)+CHR$(176)+STRING$(12,B$)
+D$+CHR$(152)+CHR$(134)+CHR$(131)+STRING$(3,32)
+PU$+STRING$(2,32)+CHR$(169)+STRING$(13,B$)+D$
+CHR$(130)+CHR$(131)+CHR$(137)+STRING$(9,140)
+CHR$(129)
90 E$(2)=STRING$(2,D$)+STRING$(21,A$)+CHR$(176)
+CHR$(152)+STRING$(5,140)+STRING$(2,176)
+STRING$(18,B$)+D$+CHR$(150)+STRING$(2,32)+PU$
+STRING$(3,32)+CHR$(131)+CHR$(137)+CHR$(164)
+STRING$(13,B$)+D$+CHR$(130)+STRING$(9,140)
+CHR$(134)+CHR$(131)+CHR$(129)
100 E$(3)=STRING$(3,D$)+STRING$(2,A$)+STRING$(13,176)
:E$(4)=STRING$(3,D$)+STRING$(20,A$)+STRING$(13,176)
200 CLS:TT=0:WW=0:INPUT"ENTER NAME    ";N$
210 CLS:W=0
:INPUT"INSTRUCTIONS  (Q)UIT   (Y)ES   (N)O  ";Q$
:IFLEFT$(Q$,1)="Q"THEN910
220 TT=TT+1
:INPUT"DEGREE OF DIFFICULTY  (1)=EASY  (10)=HARD   ";D
230 CLS:FORI=1TO3:PRINT@76,F$(I);:NEXTI:GOSUB900
240 IFLEFT$(Q$,1)="N"THENGOSUB600  :GOTO290
250 M1$=STRING$(13,131):RESTORE
260 READM2$:IFM2$<>"END"THENM2$=M1$+M2$
:GOSUB800   :M1$=RIGHT$(M2$,13):GOTO260
270 FORI=1TO500:NEXT
280 PRINT@599,STRING$(13,131);
290 R=RND(6):FORI=1TOR:READC$:NEXTI
300 F=F+(F<>0):A$=INKEY$
:IFA$=""THENIFRND(200)<10THENR=RND(10*D)
:ONRGOSUB300  ,300  ,400  ,400  :GOTO300
310 IFA$="<"ORA$=","THENIFF>0THEN500  ELSE570
320 IFA$=">"ORA$="."THENIFF>0THEN560  ELSE570
330 IFA$=CHR$(13)THEN700
340 IFA$=""THEN300ELSE570
400 PRINT@76,E$(R);:PRINT@76,E$(R-2);
410 IFR=3THENE$="L"ELSEE$="R"
```

Program continues

Dave Black
1965 Sequoia Drive
Idaho Falls, ID 83401

Are you tired of fast action-packed games? Do you want a game requiring less digital dexterity and more cerebral concentration? Here is Stanley, Champion of the Staredown.

This new game is the outgrowth of minutes of research and programming effort. Stanley will tirelessly and unblinkingly stare down almost anyone when played at the highest level of difficulty; at the lower levels Stanley is more playful than competitive.

Stanley presents the simple rules of play.

He asks that you press Enter if you should blink during the game. Though he will not chasten you if you cheat, honesty means much to Stanley. Should the Champ blink one eye or the other, hit the < (less than) key for his left eye or the > (greater than) key for his right eye. There is a response time limit that decreases with increasing degrees of difficulty. Pressing a key unnecessarily or after the time limit has expired will invoke an encouraging comment; otherwise Stanley will admit to being caught and allow you to play again.

If you wish to quit, a scoreboard of sorts will be displayed. If someone else would then like to play, he is asked to enter his name.

Add more comments to Stanley's repertoire in the second block of Data statements at the end of the program (lines 1000 through 1160).

This game has been thoroughly tested on a team of two or three people chosen at random from every walk of life in our household. In every test the game performed flawlessly; many said they felt as refreshed from the experience as from an afternoon nap. ■

The Key Box

Basic Level II
Model I
16K RAM

Scanned by Ira Goldklang - www.trs-80.com

Program continued

```
420 P=-D+15:W=W+1:WW=WW+1:RETURN
500 IFE$<>"L"THEN570
510 IFW=1THEN
PRINT@900,"YOU CAUGHT ME ON THE FIRST WINK";
520 IFW=2THEN
PRINT@900,"YOU CAUGNT ME ON THE SECOND WINK";
530 IFW=3THEN
PRINT@900,"YOU CAUGHT ME ON THE THIRD WINK";
540 IFW>3THEN
PRINT@900,"I WINKED"W-1"TIMES BEFORE YOU CAUGHT ME!";
550 FORI=1TO2000:NEXT:GOTO210
560 IFE$<>"R"THEN570  ELSE510
570 READC$:IFC$="END"THENGOSUB600  :GOTO570
580 PRINT@900,CHR$(30);C$;
590 A$=INKEY$:GOTO300
600 RESTORE
610 READC$:IFC$="END"THEN RETURN
620 GOTO 610
700 PRINT@900,
"SUCH HONESTY, SUCH INTEGRITY, SUCH STUPIDITY";
710 FORI=1TO2000:NEXT:GOTO210
800 Z=LEN(M2$)-13:FORX=1TOI
:PRINT@599,MID$(M2$,X,13);" ";
:FORI=1TO50:NEXTI:NEXTX
810 RETURN
900 FORI=1TO2:PRINT@76,E$(I);:NEXTI:RETURN
910 CLS:PRINTCHR$(23);
920 PRINTN$:PRINT:PRINT"YOU PLAYED"TT"GAMES"
:PRINT:PRINT"OF WHICH I WINKED"WW;
:IFWW>1THENPRINT"TIMES."ELSEPRINT"TIME."
930 DF=WW-TT:PRINT
:IFDF=0THENPRINT"YOU CAUGRT ME EVERY TIME"
940 IFDF>0THENPRINT"YOU MISSED"DF;
:IFDF>1THENPRINT"WINKS!"ELSEPRINT"WINK!"
950 PRINT:PRINT:INPUT"ANOTHER GAME";Q$
:IFLEFT$(Q$,1)="Y"THEN200  ELSECLS:END
1000 DATA "OK...READ MY LIPS...I'M STANLEY "
1010 DATA "AND THIS IS A STARE DOWN.  "
1020 DATA "WHEN YOU BLINK....PRESS ENTER.    "
1030 DATA "IF YOU THINK YOU HAVE CAUGHT "
1040 DATA "ME WINKING...PRESS  < FOR THE LEFT EYE --- "
1050 DATA "OR  > FOR THE RIGHT EYE --- "
1060 DATA "BE QUICK -- THERE IS A TIME LIMIT.  "
1070 DATA " OK LET'S BEGIN!!"
1080 DATA "END"
1090 DATA "QUIT PLAYING WITH THE KEYBOARD"
1100 DATA "DON'T BLINK - YOU DIDN'T CATCH ME YET"
1110 DATA "TICKLING MY KEYBOARD WON'T MAKE ME WINK"
1120 DATA "LOOK OUT BEHIND YOU !!!!!"
1130 DATA "YOUR SHOE IS UNTIED"
1140 DATA "YOUR EYES LOOK VERY DRY"
1150 DATA "YOUR FLY IS DOWN"
1160 DATA "END"
```


FREE
business software directory

- Radio Shack's Model I, II, III.
- Heath's MBASIC and HDOS
- CPM: Xerox, Alto...
- IBM Personal Computer

"IDM2 is GREAT !" -publisher of 80-US

"(GL) superior to either the Osborne (SBSG & Taranto) or Radio Shack... MAIL-X has a greater capacity... more flexible than (R.S.)"
-columnist of 80-microcomputing

"imperceptively fast...(DBMS) is a good and reliable workhorse" -publisher of Interface Age

Data base manager, integrated accounting package (AR, AP, GL & Payroll), inventory, word processing, and mailing list. Compare and be selective !

Micro Architect, Inc.
96 Dothan St., Arlington, MA 02174

149

TRS-80™-WHY BUY DIRECT?

Buying a GENUINE TRS-80 direct, literally, means buying from the Tandy Warehouses in Fort Worth. For the end user this is not possible. However, the closer a retailer is located to the source the lower his cost per unit and the closer his buyer can come to "almost" buying direct. WE ARE CLOSER so WE SELL LOWER. It only takes a FREE phone call to verify this FACT.

WARRANTY:
ONLY A GENUINE TRS-80 purchased from an Authorized-Outlet can have the Radio Shack Warranty.
BUYER BEWARE OF IMITATIONS.

SAVE SALES TAX*
PLUS DISCOUNT
*TEXAS RESIDENTS ADD ONLY 4%

"WE ARE CLOSER"

FORT WORTH COMPUTERS

IN TEXAS CALL 817-573-4111
TOLL FREE ORDER NUMBER: 1-800-433-S-A-V-E

TM: TRADE MARK OF THE TANDY CORPORATION

377 PLAZA GRANBURY • FORT WORTH • TEXAS 76048

214

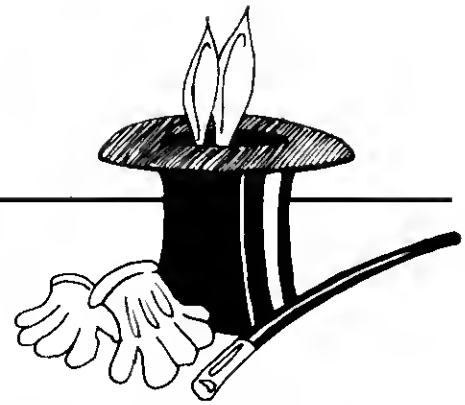
See List of Advertisers on page 338

GAME

LOAD 80

Pick a card, any card.

Amazing Cardoni II



Jon Mark O'Connor
56 Eustis Parkwey
Waterville, ME 04901

A good magician never allows you to think he tricked you. For a card trick to leave a lasting impression it has to be thoroughly prepared.

For the Amazing Cardoni's Card Trick Number 2, the spectator shuffles the cards, does a little math, selects four cards; and then chooses one from the four. Then, through seemingly unbelievable odds, Cardoni names the card.

If you analyze the program, you probably will figure out how the trick works. Don't let that stop you from entering this program; the graphics are pretty good. Even when four or five lines are moved there is no pixel drag.

Qualifications

If your spectator's answer to the math problem is less than 1,000 then tell him that the first number is zero, since he will be selecting four cards. As indicated in the program, if any number is a zero then the spectator must choose a queen. This will become clearer once you have keyed in the program. ■

The Key Box
Model I or III
Basic Level II

Program Listing

```
1# CLEAR3##0:CLS:DEFSTR-D,F,Z:DEFINTE,G-V,X,Y
2# DIMJJ%,T%,W1$,W$,TT%,G%,O%,Z$,AD$,X%,Q%,UL%,H%,XX%,U%,AA$,WI
3# DINII%,I%,UP%,AC$,WW!,R$,A%,A7$,QL%,AE$,FF$,PZ%,AB$,AF$,AH$
4# DINA$,AI$,QQ%,QI%,AJ$,C9$,C7$,C6$,AU$,C8$,JK%,A(13),B(19)
5# AX="THE AMAZING CARDONI":GOSUB115#
6# CLS:QL=8:X=326:FORG=1TO8:PRINT@X,A(G);:X=X+64:NEXT:QI=6:PRINT
@22,AZTAB(6#)"# 2"
7# PRINT@837,CHR$(17#)STRING$(5,183)CHR$(179)STRING$(5,187)AE
8# PRINT@982,CHR$(153)CHR$(166)CHR$(199)CHR$(153)CHR$(166)
9# PRINT@965,CHR$(154)AFCHR$(165)CHR$(197)CHR$(154)AFCHR$(165);:
X=28#
1## PRINT@534," WRITE DOWN A 4 DIGIT NUMBER";:PRINT@6#2,"ON A PI
ECE OF PAPER.";
11# PRINT@666,FF;:GOSUB61#:PRINT@533,"   ADD THE NUMBERS TOGETHE
R."CHR$(19#);
12# PRINT@596,CHR$(2##)"I CAN WAIT  !!!!"CHR$(2#4);:GOSUB61#
13# PRINT@534,"  NOW SUBTRACT THIS NUMBER ";
14# PRINT@598,"  FROM YOUR 4 DIGIT NUMBER.";:GOSUB61#
15# PRINT@534,"SHUFFLE CARDS. SELECT FOUR CARDS";
16# PRINT@599,"THAT MATCH THE NUMBERS IN YOUR";
17# PRINT@663,"ANSWER (ACE FOR 1 / QUEEN FOR 6).";
18# PRINT@728,"ALSO,  UTILIZE ALL FOUR SUITS.";:PRINT@795,FF;:GO
SUB61#
19# FORG=534TO854STEP64:PRINT@G,CHR$(234);:NEXT
2## PRINT@534,"IF YOU HAVE YOUR FOUR CARDS,";
21# PRINT@598,"SELECT ONE OF THEM AND PLACE";
22# PRINT@662,"IT FACE DOWN ON THE TABLE.";:PRINT@73#,FF;:GOSUB6
1#
23# FORG=534TO726STEP64:PRINT@G,CHR$(23#);:NEXT:H=3:FORG=43#TO4#
8STEP-11:GOSUB11##
24# PRINT@G,D(#);:PRINT@G+64,D(1);:PRINT@G+128,D(2);:PRINT@G+192
,D(1);
25# PRINT@G+256,D(3);:PRINT@G+324,H;:H=H-1:NEXT:X=474:I=I:JK=3
26# PRINT@792,"ACE - HIT <A>   QUEEN - HIT <Q>";:UL=999:PRINT@85
4,CHR$(23#);
27# PRINT@854,CHR$(2#2)"WHAT IS CARD #"ICHR$(21#);:PORT=1TO1#:
28# GOSUB62#:W$=INKEY$:IFN$="Q"ORW$="A"ORW$>CHR$(49)ANDW$<CHR$(5
8)THEN29#ELSE28#
29# PRINT@854,CHR$(2#4)W$" OF "CHR$(2#6);:IFW$="A"W=1:GOTO31#ELS
EIFW$="Q"W=#:GOTO31#
3## W=VAL(W$)
31# GOSUB62#:Z=INKEY$:IFZ="S"ORZ="H"ORZ="D"ORZ="C"THEN32#ELSE31#
32# IFI="S"Z=C9
33# IFI="H"Z=C8
34# IFI="D"Z=C7
35# IFI="C"Z=C6
36# FORH=1TO4:IFZ=F(H)F(H)="":GOTO38#ELSENEXT
37# PRINT@852,"    YOU MUST CHOOSE ALL FOUR SUITS.    ";:FORT=1T
O15##:NEXT:GOTO26#
38# PRINT@854,CHR$(23#);:WW=WW+W:FORG=XTOX+128STEP64:PRINT@G,CHR
$(198);:NEXT
39# PRINT@G-198,B(W);:PRINT@G-126,B(W+1#);:PRINT@G-64,Z;:IFI=3TH
EN41#ELSEI=I+1:X=X+11
4## UL=#:FORT=1TO2#:GOSUB73#:NEXT:UL=999:GOTO26#
41# PORT=1TO2#:GOSUB62#:NEXT:UL=#:FORH=1TO4:IFF(#)=""NEXTELSEZ=F
(#)
42# IFWW<18PI-9-WW:GOTO44#ELSEIFWW<19PZ-18-WW:GOTO44#ELSEIFWW<26
PZ-27-WW:GOTO44#
43# IFWW<37PZ-36-WW
44# FORU=4#8TO856STEP64:PRINT@U,STRING$(32,191);:PRINT@U,CHR$(22
5);:NEXT
45# PRINT@218,D(4)D(5);:PRINT@282,D(6)D(7);:PRINT@346,D(6)D(7);:
PRINT@41#,D(6)D(7);
46# PRINT@474,D(#)D(9);:PRINT@538,D(6)D(7);:PRINT@6#2,D(6)D(7);:
PRINT@666,D(6)D(7);
47# PRINT@73#,D(4)D(5);:PRINT@788,"     FLIP OVER CARD ON TABLE"
;:PRINT@859,FF;
48# GOSUB62#:R$=INKEY$:IFR$=CHR$(13)THEN49#ELSE48#
49# FORK=284TO668STEP64:PRINT@K,CHR$(287);:NEXT:PRINT@285,B(PZ);

5## PRINT@349,B(PZ+1#);:PRINT@617,B(PZ);:PRINT@681,B(PZ+1#);
51# IFLEFT$(Z,1)="D"Z="DIAMONDS":PRINT@46#,Z;ELSEPRINT@481,Z;
52# PRINT@78#,CHR$(23#);:PRINT@854,CHR$(23#);:FORT=1TO5#:NEXT
53# PRINT@856,"PRETTY GOOD, HUH ??!!";:FORT=1TO5#:GOSUB62#:NEXT:
POKE15624,17#
54# POKE1556#,17#:FORT=1TO9#:NEXT:PRINT@266,AH;:FORT=1TO9#:NEXT:
PRINT@282,AH;
55# PRINT@266,AI;:FORT=1TO9#:NEXT:PRINT@13#,AH;:PRINT@282,AI;:PR
INT@266,AJ;:QQ=26
56# QI=#:FORG=1TO5#:POKE15566,144:POKE1563#,129:FORT=1TO7#:NEXT:
POKE1563#,131
57# POKE15566,32:FORT=1TO6#:NEXT:ONRND(7)GOSUB64#,65#,66#,67#,82
#,84#,85#:NEXT:QL=8
58# GOSUB88#:FORQ=15951TO15523STEP-64:POKE15759,176:POKEQ,149:PO
KEQ+64,149
59# POKEQ+128,32:POKE15759,176:FORT=1TO5#:NEXT:NEXT:FORT=1TO28:G
OSUB64#:NEXT:GOSUB1#6#
6## GOSUB151#:GOTO6#
61# POKE1536#,32:POKE1536#,32:GOSUB62#:W1$=INKEY$:IFW1$=""THEN61
#ELSERETURN
62# FORT=1TORND(1##)+3##:NEXT:JJ=JJ+1:IFJJ=11JJ=#:RETURN
63# ONRND(JJ)GOTO72#,64#,65#,66#,67#,72#,68#,69#,7##,71#
64# PRINT@326,A(1);:PRINT@389,AD;A(2);:PRINT@454,A(3);:RETURN
65# PRINT@326,A(1);:PRINT@39#,A(2);:PRINT@454,A(9);:RETURN
66# PRINT@326,A(12);:PRINT@39#,A(13);:PRINT@454,A(1#);:RETURN
67# PRINT@326,A(12);:PRINT@39#,A(13);:PRINT@454,A(11);:RETURN
68# FORT=1TORND(5):GOSUB64#:FORTT=1TO8#:NEXT:GOSUB65#:FORTT=1TO8
#:NEXT:NEXT:RETURN
69# FORT=1TORND(5):GOSUB66#:FORTT=1TO8#:NEXT:GOSUB67#:FORTT=1TO8
#:NEXT:NEXT:RETURN
7## RETURN
71# FORT=1TORND(5):GOSUB68#:FORTT=1TO8#:NEXT:GOSUB64#:FORTT=1TO8
#:NEXT:NEXT:RETURN
72# POKE15864,32:POKE15945,15#:POKE16#15,149:POKE15951,149:POKE1
6#79,32
73# IFUL=999RETURNELSEFORT=1TORND(1##)+3##:NEXT
74# ONRND(11)GOTO82#,83#,84#,85#,88#,93#,1###,77#,8##,81#
75# FORT=1TORND(1#):POKE16148,141:FORTT=1TO6#:NEXT:POKE16148,181
:FORTT=1TO6#:NEXT
76# POKE16146,141:FORTT=1TO6#:NEXT:POKE16148,181:FORT=1TO6#:NEXT
:RETURN
77# FORT=1TORND(5)+5:POKE15951,32:POKE16#15,144:POKE16#15,32:POK
E16#79,32
78# FORTT=1TO5#:NEXT:POKE15951,32:POKE16#15,149:POKE16#79,149:FO
RTT=1TO5#:NEXT
79# POKE15951,149:POKE16#15,149:POKE16#79,32:FORTT=1TO5#:NEXT:NE
XT:RETURN
8## POKE15951,148:POKE16#15,149:POKE16#79,129:RETURN
81# POKE15951,144:POKE16#15,149:POKE16#79,133:RETURN
82# POKE16##8,138:POKE16##9,32:POKE16#79,32:PRINT@581,AD;A(5);:I
I=#:RETURN
83# PRINT@646,A7;:RETURN
84# POKE16##8,138:POKE16##9,32:RETURN
85# PRINT@646,A7;:UP=RND(3):IFII=999RETURNELSEPOKE15951,32:PRINT
@655,AA;:FORT=1TO5#
86# NEXT:PRINT@655,AECHR$(197);:POKE16#79,149:II=999:IFUP=1THEN8
2#ELSEIFUP=2THEN88#
87# RETURN
88# POKE16###,138:POKE16##9,32:POKE15951,32:POKE16#79,149:FORT=1
TO5#:NEXT
89# POKE16#15,32:POKE16143,149:IFRND(8)=QLTHEN1#6#ELSEFORT=1TO5#
:NEXT
```

Program continues

Your best Model I/III peripheral buy is a modem.

Considering expanding your TRS-80 Model I or III? Then you should know that **only one kind of peripheral** can give you all these **extra capabilities** . . . in a single unit:

- **Computer-to-computer data communications, for better personal or business management.**
- **Access to free "bulletin board" resources.**
- **Access to *Source*, *CompuServe* and other time-sharing systems.**
- **Services like electronic mail, instant news and financial reports.**
- **An almost limitless supply of new games and other enthusiast activities.**

Of course, we're talking about a modem. A far more **sensible** first step in expanding than, say, joysticks, or a voice box, or a printer. And, therefore, your **best peripheral buy.**

A modem opens up a whole new world to you. A world of **thousands of computers** and computer people just like you, in homes and businesses around the block and across the country. A world you tap through your telephone.

But don't simply settle for any modem. For the most **modem** satisfaction, you need to make the **best modem buy.**

And that's **LYNX.**

The new LYNX for TRS-80 Model I and Model III. It's the latest innovation from the people who are making data communications affordable. It's the best first step you can take in expanding. It makes your microcomputer a whole new animal.

Your best Model I/III modem buy is LYNX.

The new LYNX is the ideal modem for your Model I or III. That's because it's the **key element** of a **total direct-connect telephone communications package.**

This package includes all serial and computer bus interfaces, cables and terminal software . . . and comes to you with these remarkable features:

- **SINGLE PRICE: $299.95!**
- **Compatible with both Model I and III.**
- **No separate purchases required.**
- **One-year warranty.**
- **Auto dial/auto answer.**
- **Works with any software, including ST-80 by Micklus.**
- **Active clear, break, and "control" keys.**
- **Half or full duplex, variable word length, parity and stop bits.**
- **Dial from phone, keyboard, or memory.**
- **Works with or without Model I expansion interface.**
- **Works with or without Model III RS-232 card.**
- **Can be placed on either side of Model III.**
- **No tools needed to install.**

No other modem gives you so much in a **single package.** And when you **compare** the LYNX price with the **total cost** of bringing any other modem on line, it could **save you OVER $100!**

ESI LYNX

123 LOCUST STREET LANCASTER, PENNSYLVANIA 17602
Phone 717/291-1116

TRS-80 is a trademark of the Radio Shack Division of Tandy Corporation.
FCC Registration Number: A909KE-68171-DM-N

↗49

VISA

Consult your local microcomputer retailer, or call one of these LYNX handlers today—TOLL FREE:

THE BOTTOM LINE Milford, NH 800/343-0726	BREEZE/QSD Dallas, TX 214/484-2976	THE PROGRAM STORE Washington, DC 800/424-2738	SIMUTEK Tucson, AZ 800/528-1149	SOFT SECTOR MARKETING Garden City, MI 800/521-6504
B. T. ENTERPRISES Centereach, NY 516/981-8568	COMPUTER PLUS Littleton, MA 800/343-8124	STEVENS COMPUTERS Phoenixville, PA 800/345-6279	PROGRAMS UNLIMITED Jericho, NY 800/645-6038	

See List of Advertisers on page 338

SOFTWARE CONCEPTS
DALLAS TEXAS

SPECIAL DELIVERY

Now is the time to turn your TRS-80 and your text editor into a REAL word processing machine.
EXCELLENT...Creative Computing Review.
State of the Art... 80 Microcomputing Review.

- Maintain your mail list
- Print personalized FORM letters.
- Free format labels
- 100% machine language
- Enter names at typist speeds
- Use with Scripsit, Lazywriter, Electric Pencil (we sell them all!)
- Extract selected names
- Boldface & underscore
- Get your form letters past the secretary's desk!

XTRA Special Delivery Includes all of the above PLUS:
- Disk Sorts
- Multi Label printer
- Key definitions

This is the LAST mailing list you will ever have to buy!!

FOR YOUR MODEL I OR III:
(requires minimum 32K & single drive)

SPECIAL DELIVERY $125
XTRA SPRCIAL DELIVERY $199

FOR YOUR MODEL II
(requires Scripsit 2.0)

SPECIAL DELIVERY $199

Over 2800 satisfied customers
(plus 12 that won't speak to us any more)

Electric Pencil 2.0 ..... $80.00
Lazywriter $165.00
Scripsit $95.00

(Most TRS software available at similar discounts. CALL!)

SOFTWARE CONCEPTS
105 Preston Valley Shopping Center
Dallas, Texas 75230

Our retail store is located at the SW corner of Preston & LBJ

(214) 458-0330

MasterCard, Visa, American Express, COD

43

Program continued

```
900 PRINT@780,CHR$(138)CHR$(176);:FORT=1TO50:NEXT
910 PRINT@780,CHR$(138)CHR$(184)CHR$(144);:POKE16143,32:PRINT@77
4,A(8)CHR$(198);
920 POKE16815,169:FORT=1TO50:NEXT:POKE16879,32:POKE15951,169:RET
URN
930 POKE16888,138:POKE16889,32:IFII=999RETURNELSEFORT=1TO2:POKE1
5951,32:POKE16815,32
940 PRINT$648,STRING$(2,148)CHR$(138)CHR$(191)CKR$(133)CHR$(148)
CHR$(133);
950 FORTY=1TO28:NEXT:POKE16813,32:PRINT$662,AACHR$(136)AD;:FORTT
=1TO28:NEXT
960 PRINT@662,CHR$(197)CHR$(178)CHR$(136)AD;:POKE15943,178:POKE1
5951,32
970 POKE16815,32:FORTTT=1TO28:NEXT:POKE16887,32:POKE15943,32:PRI
NT@655,AA;
980 FORTT=1TO40:NEXT:PRINT@655,CHR$(198);:POKE15951,149:POKE1681
4,137:POKE16815,169
990 FORTT=1TO40:NEXT:NEXT:RETURN
1000 IFRND(9)<Q1RETURNELSEPRINT@647,ADCHR$(131)AD;:FORT=1TO28:NE
XT:PRINT@647,AF;
1010 PRINT@583,ADCER$(164)CHR$(158);:FORT=1TO28:NEXT:PRINT@583,C
HR$(138)CHR$(184);
1020 FORT=1TO28:NEXT:PRINT@583,ADCHR$(165);:FORT=1TO28:NEXT
1030 PRINT$583,ADCHR$(128)CHR$(131);:POKE15888,171:FORTT=1TORND(
5)+QQ:POKE15888,165
1040 FORT=1TO50:NEXT:POKE15888,178:FORT=1TO50:NEXT:NEXT:POKE1588
8,32:POKE15945,158
1050 POKE16888,138:RETURN
1060 POKE16815,32:POKE16879,32:FORT=1TO5:PRINT@783,AC;:FORTT=1TO
28:NEXT
1070 PXINT$783,AA;:FORTT=1TO28:REXT:NEXT:XX=783:FORG=1TO3:PRINT@
XX,AC;:PRINT@XX,AA;
1080 PRINT@XX,AB;:PRINT@XX,CHR$(198);:XX=XX-64:NEXT:POKE15951,16
9:POKE16815,169
1090 RNTURN
1100 POKE16879,32:POKE16888,138:POKE16889,32:POKE15951,32:PRINT@
655,AA;
1110 PRINT@662,STRING$(9,148);:FORQ=16831TO16852-O:POKEQ,148:REX
T:FORT=1TO5
1120 PRIRT$662,STRING$(38-O,132);:PRIRT$682,STRING$(38-O,136);
1130 PXIRT@662,CHR$(224-O);:NEXT:O=O+11:PRINT@655,CHR$(198);:POK
E15951,149
1140 POKE16815,169:RETURN
1150 PRINT@478,AI$:PRINT@536,"CARD TRICK 8 2";PRINT@597,"BY JON
 MARK O'CONNOR"
1160 A7=STRING$(3,32)+CRN$(137):AU=STRING$(9,191):AA=STRING$(8,1
48)

1170 AB=STRING$(8,131):AC=STRING$(8,176):AD+CHR$(32):AE=CHR$(149
):AF=STRING$(2,32)
1180 RH=CHR$(169)+CHR$(32)+CHR$(32)+CHR$(32)+CHR$(158)
1190 AI+CHR$(166)+CHR$(153)+CHR$(166)+CHR$(153)
1200 AJ+CHR$(168)+CHR$(190)+CHR$(189)+CHR$(152)+CHR$(137)
1210 PF="HIT ENTER WHEN READY !!"
1220 A(1)=STRING$(2,32)+CHR$(178)+STRING$(2,191)+CHR$(163)+CHR$(
187)+STRING$(2,191)+STRING$(2,32)
1230 A(2)=STRING$(2,176)+CHR$(186)+STRING$(2,191)+CHR$(178)+CHR$
(187)+STRING$(2,191)+STRING$(2,176)
1240 A(3)+CRN$(32)+CHR$(138)+CHR$(139)+CHR$(175)+CHR$(179)+CHR$(
163)+CHR$(179)+CHR$(159)+CHR$(135)+CHR$(129)+CHR$(32)
1250 A(4)=STRING$(4,32)+CHR$(138)+CHR$(191)+CHR$(139)+STRING$(4,
32)
1260 A(5)=STRING$(3,32)+CHR$(158)+CHR$(175)+CHR$(191)+CHR$(159)+
CHR$(169)+CHR$(32)+CER$(169)+CHR$(32)
1270 A(6)=STRING$(2,32)+CHR$(134)+CHR$(32)+CHR$(138)+CHR$(191)+C
HR$(133)+CHR$(32)+CHR$(137)+CER$(149)+CHR$(32)
1280 A(7)=STRING$(4,32)+CHR$(178)+CHR$(32)+CHR$(149)+STRING$(4,3
2)
1290 A(8)=STRING$(4,32)+CHR$(188)+CHR$(32)+CHR$(181)+STRING$(4,3
2)
1300 A(9)=STRING$(2,32)+CHR$(139)+CHR$(175)+CHR$(176)+CHR$(143)+
CHR$(176)+CHR$(159)+CHR$(135)+STRING$(2,32)
1310 A(10)=STRING$(2,33)+CHR$(139)+CHR$(175)+CHR$(181)+CHR$(154)
+CHR$(165)+CHR$(154)+CHR$(129)+STRING$(2,32)
1320 A(11)=STRING$(2,32)+CHR$(139)+CHR$(175)+CHR$(183)+CHR$(155)
+CHR$(167)+CHR$(155)+CHR$(129)+STRING$(2,32)
1330 A(12)=STRING$(2,32)+CHR$(178)+STRING$(2,191)+CHR$(151)+CHR$
(187)+CHR$(191)+CRR$(149)+STRING$(2,32)
1340 A(13)=STRING$(2,176)+CHR$(186)+STRING$(2,191)+CHR$(181)+CHR
$(187)+CHR$(191)+CHR$(181)+CHR$(176)+CHR$(32)
1350 B(8)+CHR$(151)+CHR$(171):B(1)+CHR$(182)+CHR$(165):B(2)+CHR$
(134)+CHR$(169)
1360 B(3)=B(2):B(4)+CHR$(152)+CHR$(129):B(5)+CHR$(183)+CHR$(179)

1370 B(6)+CHR$(152)+CHR$(129):B(7)+CHR$(131)+CHR$(171):B(8)+CHR$
(166)+CHR$(153)
1380 B(9)=CHR$(166)+CHR$(185):B(10)=CHR$(137)+CHR$(168):B(11)=CH
R$(149)+CHR$(178)
1390 B(12)+CHR$(182)+CHR$(177):B(13)=CHR$(164)+CHR$(153):B(14)+C
HR$(163)+CHR$(183)
1400 B(15)+CHR$(184)+CHR$(154):B(16)=CHR$(167)+CHR$(153):B(17)+C
HR$(152)+CHR$(129)
1410 B(18)+CHR$(183)+CHR$(187):B(19)+CHR$(168)+CHR$(134)
1420 D(8)=CER$(191)+CHR$(159)+STRING$(6,179)+CHR$(175)+CHR$(191)

1430 D(1)+CHR$(191)+CHR$(178)+STRING$(3,153)+STRING$(3,166)+CHR$
(169)+CHR$(191)
1440 D(2)+CHR$(191)+CHR$(178)+STRING$(2,179)+CHR$(188)+CHR$(153)
+STRING$(2,179)+CHR$(169)+CHR$(191)
1450 D(3)=CHR$(191)+CHR$(189)+STRING$(6,179)+CHR$(198)+CHR$(191)

1460 D(4)=STRING$(2,191)+STRING$(8,179):D(5)=STRING$(8,179)+STRI
NG$(2,191)
1470 D(6)=STRING$(2,191)+CHR$(32)+CHR$(181)+STRING$(8,153)
1480 D(7)=STRING$(6,166)+CHR$(151)+CHR$(32)+STRING$(2,191)
1490 D(8)=STRING$(2,191)+CHR$(32)+STRING$(6,191)+STRING$(2,179)+
CHR$(191)
1500 D(9)=CHR$(191)+CHR$(179)+CHR$(179)+STRING$(4,191)+CHR$(32)+

STRING$(2,191)
1510 QQ=0:WW=0:O=0:F(1)="SPADES":F(2)="HEARTS":F(3)="DIAMDS":F(4
)="CLUBS":C9=F(1)
1520 C8=F(2):C7=F(3):C6=F(4):RETURN
```

80 micro BOOK SHELF

HOBBY COMPUTERS ARE HERE!!! If you want to come up to speed on how computers work—hardware and software—this is an excellent book. It starts with fundamentals and explains the circuits and the basics of programming, along with a couple of TVT construction projects, ASCII, Baudot, etc. This book has the highest recommendations as a teaching aid. $4.95.* BK7322

THE NEW HOBBY COMPUTERS—This book takes it from where Hobby Computers Are Here! leaves off, with chapters on Large-Scale Integration, how to choose a microprocessor chip, an introduction to programming, low cost I/O for a computer, computer arithmetic, checking memory boards . . . and much, much more! Don't miss this tremendous value! Only $4.95.* BK7340

NEW NEW NEW

INTRODUCTION TO WORD PROCESSING by Hal Glatzer. This book explains in plain language what a word processor can do, how to use one, how it improves productivity—especially in businesses that handle lots of words—and how to buy one wisely. No technical knowledge required, for all first time users and those considering purchasing a word processor. BK1238 $12.95

A USER GUIDE TO THE UNIX SYSTEM by Jean Yates and Rebecca Thomas. Here at last is a clearly written book that allows you to use the Unix operating system easily and at a fraction of the time it previously took. If you're using, evaluating or simply curious about this system, this is your book. BK1242 $16.99

WORDSTAR MADE EASY by Walter A. Ellin. NowWordStar is as simple to learn as it is easy to use. This book teaches WordStar in 14 easy lessons, saving hours of hard work. It comes with a convenient pull-out Command Card. BK1233 $7.95

AN INTRODUCTION TO MICROCOMPUTERS, VOL 0
The Beginner's Book—Written for readers who know nothing about computers—for those who have an interest in how to use computers—and for everyone else who must live with computers and should know a little about them. The first in a series of 4 volumes, this book will explain how computers work and what they can do. Computers have become an integral part of life and society. During any given day you are affected by computers, so start learning more about them with Volume 0. BK1130 $7.95.*

VOL 1—2nd Edition completely revised. Dedicated to the basic concepts of microcomputers and hardware theory. The purpose of Volume 1 is to give you a thorough understanding of what microcomputers are. From basic concepts (which are covered in detail), Volume 1 builds the necessary components of a microcomputer system. This book highlights the difference between minicomputers and microcomputers. BK1030 $12.99.*

KILOBAUD KLASSROOM—by George Young and Peter Stark. Learning electronics theory without practice isn't easy. And it's no fun to build an electronics project that you can't use. *Kilobaud Klassroom*, the popular series first published in *Kilobaud Microcomputing*, combines theory with practice. This is a *practical* course in digital electronics. It starts out with very simple electronics projects, and by the end of the course you'll construct your own working microcomputer!
Authors Young and Stark are experienced teachers, and their approach is simple and direct. Whether you're learning at home or in the classroom, this book provides you with a solid background in electronics—and you'll own a computer that you built yourself! BK7386 $14.95

TOOLS & TECHNIQUES FOR ELECTRONICS—by A. A. Wicks is an easy to understand book written for the beginning kit-builder as well as the experienced hobbyist. It has numerous pictures and descriptions of the safe and correct ways to use basic and specialized tools for electronic projects, as well as specialized metal-working tools and the chemical aids which are used in repair shops. $4.95.* BK7348

• UNDERSTANDING AND PROGRAMMING MICROCOMPUTERS—BK7382—A valuable addition to your computing library. This two-part text includes the best articles that have appeared in 73 and Kilobaud Microcomputing magazines on the hardware and software aspects of microcomputing. Well-known authors and well-structured text helps the reader get involved. $10.95.*

• SOME OF THE BEST FROM KILOBAUD MICROCOMPUTING—BK7311—A collection of the best articles that have appeared in Kilobaud MICROCOMPUTING. Included is material on the TRS-80 and PET systems, CP/M, the 8080/8085/Z-80 chips, the ASR-33 terminal. Data base management, word processing, text editors and file structures are covered too. Programming techniques and hardware construction projects for modems, high speed cassette interfaces and TVTs are also included in this large format, 200 plus page edition. $10.95.*

DON'T (or How to Care for Your Computer)—by Rodnay Zaks. In plain language, with numerous illustrations, this book tells all the do's and don't's of the care, preservation and correct operation of the small computer system. Specific chapters cover each piece of hardware and software as well as safety and security precautions and help for problem situations. Have your computer work right the first time and keep it working. No technical background required. For all computer users. BK1237 $11.95

YOUR FIRST COMPUTER—By Rodnay Zaks. Whether you are using a computer, thinking about using one or considering purchasing one, this book is indispensable. It explains what a computer system is, what it can do, how it works and how to select various components and peripheral units. It is written in everyday language and contains invaluable information for the novice and the experienced programmer. (The first edition of this book was published under the title "An Introduction to Personal and Business Computing.") BK1191 $8.95.*

MICROPROCESSOR INTERFACING TECHNIQUES—by Austin Lesea & Rodnay Zaks—will teach you how to interconnect a complete system and interface it to all the usual peripherals. It covers hardware and software skills and techniques, including the use and design of model buses such as the IEEE 488 or S-100. BK1037 $17.95.*

TRS 80 DISK AND OTHER MYSTERIES—by Harvard C. Pennington. This is the definitive work on the TRS-80 disk system. It is full of detailed "How to use" information with examples, samples and in-depth explanations suitable for beginners and professionals alike. The recovery of one lost file is worth the price alone. BK1181 $22.50.*

MICRODSOFT BASIC DECODED AND OTHER MYSTERIES—by James Farvour. From the company that brought you *TRS-80 DISK AND OTHER MYSTERIES*. Contains more than 6500 lines of comments for the disassembled Level II ROMs and six additional chapters describing every BASIC subroutine, with assembly language routines showing how to use them. Flowcharts for all major routines give the reader a real insight into how the interpreter works. BK1196 $29.50.*

Special Interests

MOD III ROM COMMENTED—Soft Sector marketing, 1981. This book is not an instruction course on machine language, but rather an information source that you can use time and time again for writing your own program or patching old Mod I machine language programs. It contains an explanation of ROMs in the latest machine from Tandy, with most every location of the 14K ROMs listed, with comments. BK1235 $22.50

THE CUSTOM TRS-80 AND OTHER MYSTERIES—by Dennis Pulz. More than 300 pages of TRS-80 customizing information. With this book you'll be able to explore your computer like never before. Want to turn an 8 track into a mass storage unit? Individual reverse characters? Replace the BASIC ROMs? Make Music? High speed reverse video, Level I and Level II? Fix it if it breaks down? All this and much, much more. Even if you have never used a soldering iron or read a circuit diagram, this book will teach you how! This is the definitive guide to customizing your 80! BK1218 $29.95.*

BASIC FASTER AND BETTER AND OTHER MYSTERIES—by Lewis Rosenfelder. You don't have to learn assembly language to make your programs run fast. With the dozens of programming tricks and techniques in this book you can sort at high speed, swap screens in the twinkling of an eye, write INKEY routines that people think are in assembly language and add your own commands to BASIC. Find out how to write elegant code that makes your BASIC really hum, and explore the power of USR calls. BK1221 $29.95.*

THE CP/M HANDBOOK (with MP/M)—by Rodnay Zaks. A complete guide and reference handbook for CP/M—the industry standard in operating systems. Step by step instruction for everything from turning on the system and inserting the diskette to correct user discipline and remedial action for problem situations. This also includes a complete discussion of all versions of CP/M up to and including 2.2, MP/M and CDOS. BK1187 $14.95.*

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

*No C.O.D. orders accepted. All orders add $1.50 for first book, $1.00 each additional book. $10.00 per book foreign airmail. Please allow 4-6 weeks for delivery. Questions regarding your order? Please write to Customer Service at the following address. Use the order card in this magazine or itemize your order on a separate piece of paper and mail to *80 Microcomputing* Book Department • Peterborough NH 03458. Be sure to include check or detailed credit card information.

For Toll Free Ordering Call 1-800-258-5473

80 micro BOOK SHELF

INSIDE LEVEL II—For machine language programmers. This is a comprehensive reference guide to the Level II ROMs, allowing easy utilization of the sophisticated routines they contain. It concisely explains set-ups, calling sequences, variable passage and I/O routines. Part II presents an entirely new compatible program structure which unloads under the SYSTEM command and executes in both BASIC and machine code with the speed and efficiency of a compiler. Special consideration is given to disk systems. BK1183 $15.95 *

Z-80 ASSEMBLY LANGUAGE PROGRAMMING—BK1177—by Lance A. Leventhal. This book thoroughly covers the Z-80 instruction set, abounding in simple programming examples which illustrate software development concepts and actual assembly language usage. Features include Z-80 I/O devices and interfacing methods, assembler conventions, and comparisons with 8080A/8085 instruction sets and interrupt structure. $16.99 *

Z80

TRS-80 ASSEMBLY LANGUAGE—by Hubert S. Howe, Jr. This book incorporates into a single volume all the pertinent facts and information you need to know to program and enjoy the TRS-80. Included are clear presentations of all introductory concepts, completely tested practical programs and subroutines, details of ROM and RAM and disk operating systems, plus comprehensive tables, charts and appendices. Suitable for the first time user or more experienced users. BK1217 $9.95 *

PROGRAMMING THE Z-80—by Rodney Zaks. Here is assembly language programming for the Z-80 presented as a progressive, step-by-step course. This book is both an educational text *and* a self-contained reference book, useful to both the beginning and the experienced programmer who wish to learn about the Z-80. Exercises to test the reader are included. BK1122 $15.95 *

6809

6809 MICROCOMPUTER PROGRAMMING AND INTERFACING—by Andrew C. Staugaard, Jr. Getting involved with Tandy's new Color Computer? If so, this new book from the Blacksburg Group will allow you to exploit the awesome power of the machine's 6809 microprocessor. Detailed information on processor architecture, addressing modes, register operation, data movement, arithmetic/logic operations, I/O and interfacing is provided, as well as a review section at the end of each chapter. Four appendices are included covering the 6809 instruction set, specification sheets of the 6809 family of processors, other 6800 series equipment, and the 6809/6821 Peripheral Interface Adapter. This book is a must for the serious Color Computer owner. BK1215 $13.95 *

NANOS SYSTEM REFERENCE CARDS

For Models I, II, III and color computer

At last! No more flipping through the pages of the Basic manual. No more working through the maze of machine language instructions. These cards completely summarize the Basic and Assembler manuals' FEATURES INCLUDE

memory map, eyeball graphics, math instructions, basic commands, store instructions, basic functions, load instructions, basic statements, move instructions, special keys, exchange instructions, print using, examples, shift instructions, basic special characters, compare instructions, basic and assembler messages and codes, branch instructions, basic facts, data alteration instructions, reserved words, I/O instructions, ROM routines, complete character chart with graphics and space compression codes, hex-dec chart, control code cross-reference, assembler instructions, commands and operators, screen line layout, editor commands & subcommands, condition code easy access.

Designed as a fold-up, accordion-style card, fits in your pocket. Panels organized for optimum speed for reference.

Model I: BASIC only FC1001	$2.95
Model I: BASIC and Assembler FC1002	$4.95
Model II: BASIC and Assembler FC1005	$5.95
Model III: BASIC only FC1004	$3.95
Model III: BASIC and Assembler FC1003	$5.95
Color: BASIC and Extended FC1006	$4.95

***MICROCOMPUTING* CODING SHEETS**. *Microcomputing*'s dozen or so programmers wouldn't try to work without these handy scratch pads which help prevent the little errors that can cost hours and hours of programming time. Available for programming in Assembly/Machine Language (PD1001), which has columns for address, instruction (3 bytes), source code, label, op code, operand, and comments, and for BASIC (PD1002) which is 72 columns wide. 50 sheets to a pad. $2.39 *

ALL NEW FOR 80 OWNERS ENCYCLOPEDIA FOR THE TRS-80*

ENCYCLOPEDIA FOR THE TRS-80™ is the newest periphera for your microcomputer. This ten volume reference series contains programs and articles especially selected to extend the documentation that comes with the TRS-80. Volumes of the Encyclopedia are being issued one at a time, approximately six weeks apart. This means that each new volume will reflect the latest developments in TRS-80 microcomputing. Encyclopedia for the TRS-80 is available in two editions. The deluxe COLLECTOR'S EDITION has a handsome green and black hard cover with a dust jacket. A soft cover edition is also available.

To order single hard cover volumes of the Encyclopedia please specify:

Volume 1	EN8101	$19.95*
Volume 2	EN8102	$19.95*
Volume 3	EN8103	$19.95*
Volume 4	EN8104	$19.95*
Volume 5	EN8105	$19.95*
Volume 6	EN8106	$19.95*
Volume 7	EN8107	$19.95*
Volume 8	EN8108	$19.95*
Volume 9	EN8109	$19.95*
Volume 10	EN8110	$19.95*

To order single softcover volumes of the Encyclopedia please specify:

Volume 1	EN8081	$10.95*
Volume 2	EN8082	$10.95*
Volume 3	EN8083	$10.95*
Volume 4	EN8084	$10.95*
Volume 5	EN8085	$10.95*
Volume 6	EN8086	$10.95*
Volume 7	EN8087	$10.95*
Volume 8	EN8088	$10.95*
Volume 9	EN8089	$10.95*
Volume 10	EN8090	$10.95*

ENCYCLOPEDIA LOADER is the software companion to the Encyclopedia for the TRS-80. This special series of cassettes will allow you to load selected programs from the Encyclopedia instantly. Hours of keyboarding time and the aggravating search for typos is eliminated by using the Encyclopedia Loader.

Encyclopedia Loader for Volume 1 of the Encyclopedia of the TRS-80 is available at a **Special Introductory** Price of $12.95 (a $14.95 value). To take advantage of this offer specify:

EL8001 11 $12.95*

Additional Encyclopedia Loaders will be available as each volume of the Encyclopedia for the TRS-80 is issued. To order, specify Encyclopedia Loader:

Volume 2	EL8002	$14.95*
Volume 3	EL8003	$14.95*
Volume 4	EL8004	$14.95*
Volume 5	EL8005	$14.95*
Volume 6	EL8006	$14.95*
Volume 7	EL8007	$14.95*
Volume 8	EL8008	$14.95*
Volume 9	EL8009	$14.95*
Volume 10	EL8010	$14.95*

SPECIAL OFFER

All 10 Volumes of ENCYCLOPEDIA LOADER™

A $149.50 value for only $119.97

EL8000 $119.97

Shipping included

*No C.O.D. orders accepted. All orders add $1.50 for first book, $1.00 each additional book, $10.00 per book foreign airmail. Please allow 4-6 weeks for delivery. Questions regarding your order? Please write to Customer Service at the following address. Use the order card in this magazine or itemize your order on a separate piece of paper and mail to: 80 *Microcomputing* Book Department • Peterborough, NH 03458. Be sure to include check or detailed credit card information.

For Toll Free Ordering Call 1-800-258-5473

80 micro BOOK SHELF

Basic & Pascal

THE BASIC HANDBOOK—SECOND EDITION—by David Lien. This book is unique. It is a virtual ENCYCLOPEDIA of BASIC. While not favoring one computer over another, it explains over 250 BASIC words, how to use them and alternate strategies. If a computer does not possess the capability of a needed or specified word, there are often ways to accomplish the same function by using another word or combination of words. That's where the HANDBOOK comes in. It helps you get the most from your computer, be it a "bottom-of-the-line" micro or an oversized monster. BK1174 $19.95.*

LEARNING TRS-80 BASIC—by David A. Lien. Dr. Lien, who is the author of THE BASIC HANDBOOK and the original Radio Shack LEVEL I USER'S MANUAL, has compiled a tutorial which includes portions of the original USER'S MANUAL, and most of LEARNING LEVEL II, along with extensive additions. It will completely cover the TRS-80 Models I, II, III, and 16 (sorry, not the color or pocket computers). It is, of course, written in the easy learning style which readers of Dr. Lien's books have come to enjoy. BK1175 $19.95.

BASIC BASIC (2ND EDITION)—by James S. Coan. This is a textbook which incorporates the learning of computer programming using the BASIC language with the teaching of mathematics. Over 100 sample programs illustrate the techniques of the BASIC language and every section is followed by practical problems. This second edition covers character string handling and the use of data files. BK 1026 $11.50.*

INTRODUCTION TO TRS-80 LEVEL II BASIC AND COMPUTER PROGRAMMING—by Michael P. Zaborski. Written by an experienced educator, this is the book for those beginners who want to learn about computers without having to become an expert. It has practical programs, useful line-by-line comments, excellent flow charts accompanied by line numbers and over 200 exercises which help the reader assess progress, reinforce comprehension, and provide valuable practical experience. BK1219 $10.95.*

50 BASIC EXERCISES—by J. P. Lamoitier. This book is structured around the idea that the best way to learn a language is through actual practice. It contains 50 completely explained exercises: statement and analysis of the problem, flowcharts, programs and actual runs. Program subjects include mathematics, business, games, and operations research, and are presented in varying levels of difficulty. This format enables anyone to learn BASIC rapidly, checking their progress at each step. BK1192 $12.95.*

PROGRAMMING IN PASCAL—by Peter Grogono. The computer programming language PASCAL was the first language to embody in a coherent way, the concepts of structured programming, which has been defined by Edsger Dijkstra and C.A.R. Hoare. As such, it is a landmark in the development of programming languages. PASCAL was developed by Niklaus Wirth in Zurich; it is derived from the language ALGOL 60 but is more powerful and easier to use. PASCAL is now widely accepted as a useful language that can be efficiently implemented, and as an excellent teaching tool. It does not assume knowledge of any other programming language and therefore suitable for an introductory course. BK1140 $12.95.*

ADVANCED BASIC—Applications including strings and files, coordinate geometry, area, sequences and series, simulation and graphing and games. BK1000 $10.75.*

INTRODUCTION TO PASCAL—By Rodnay Zaks. A step-by-step introduction for anyone wanting to learn the language quickly and completely. Each concept is explained simply and in a logical order. All features of the language are presented in a clear, easy-to-understand format with exercises to test the reader at the end of each chapter. It describes both standard PASCAL and UCSD PASCAL, the most widely used dialect for small computers. No computer or programming experience is necessary. BK1189 $15.95.

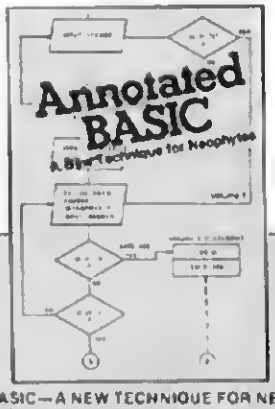
Moneymaking

HOW TO MAKE MONEY WITH COMPUTERS—In 10 information-packed chapters, Jerry Felsen describes more than 30 computer-related, money-making high profit, low capital investment opportunities. BK1003 $15.00.*

HOW TO SELL ANYTHING TO ANYBODY—According to *The Guinness Book of World Records*, the author, Joe Girard, is the world's greatest salesman. This book reveals how he made a fortune—and how you can, too. BK7306 $2.25.*

THE INCREDIBLE SECRET MONEY MACHINE—by Don Lancaster. A different kind of "cookbook" from Don Lancaster. Want to slash taxes? Get free vacations? Win at investments? Make money from something that you like to do? You'll find this book essential to give you the key insider details of what is really involved in starting up your own money machine. BK1071 $5.95.*

NEW NEW NEW



ANNOTATED BASIC—A NEW TECHNIQUE FOR NEOPHYTES.—BASIC programming was supposed to be simple—a beginner's programming language which was so near to English that it could be easily understood. But, in recent years, BASIC has become much more powerful and therefore much more difficult to read and understand. BASIC simply isn't basic anymore.

Annotated BASIC explains the complexities of modern BASIC. It includes complete TRS-80® Level II BASIC programs that you can use. Each program is annotated to explain in step by step fashion the workings of the program. Programs are flowcharted to assist you in following the operations sequence. And—each chapter includes a description of the new concepts which have been introduced.

Annotated BASIC deals with the hows and whys of TRS-80 BASIC programming. How is a program put together? Why is it written that way? By observing the programs and following the annotation you can develop new techniques to use in your own programs—or modify commercial programs for your specific use.

Annotated BASIC Volume 1 BK7384 $10.95
Annotated BASIC Volume 2 BK7385 $10.95
Order Both Volumes and Save! BK738402 $18.95

Games

CAPTAIN 80 BOOK OF BASIC ADVENTURES—by Robert Liddil. This book contains 80 of the most popular Adventure programs available today, all in one easy to read book with listings ready to be keyed in to your computer. This unique book also contains an ADVENTURE GENERATOR program, not available from any other source. This generator program will actually write another BASIC ADVENTURE PROGRAM! Although specifically written for the TRS-80 Model I & III, these programs are adaptable to other computers using Microsoft BASIC. BK 1240 $19.95.

40 COMPUTER GAMES FROM KILOBAUD MICROCOMPUTING—Forty games in all in nine different categories. Games for large and small systems, and even a section on calculator games. Many versions of BASIC used and a wide variety of systems represented. A must for the serious computer gamesman. BK7381 $7.95.*

BASIC COMPUTER GAMES—Okay, so once you get your computer and are running in BASIC, then what? Then you need some programs in BASIC, that's what. This book has 101 games for you from very simple to real buggers. You get the games, a description of the games, the listing to put in your computer and a sample run to show you how they work. Fun. Any one game will be worth more than the price of the book for the fun you and your family will have with it. BK1074 $7.50.*

MORE BASIC COMPUTER GAMES—Edited by David H. Ahl. More fun in BASIC! 84 new games from the people who brought you *BASIC Computer Games*. Includes such favorites as Minotaur (battle the mythical beast) and Eliza (unload your troubles on the doctor at bargain rates). Complete with game description, listing and sample run. BK1182 $7.50.*

WHAT TO DO AFTER YOU HIT RETURN—PCC's first book of computer games. 48 different computer games you can play in BASIC: programs, descriptions and many illustrations. Lunar Landing, Hamurabi, King, Civel 2, Dubic 5, Taxman, Star Trek, Crash, Market etc. BK1071 $16.50.*

Business

PIMS, PERSONAL INFORMATION MANAGEMENT SYSTEM—Learn how to unleash the power of a personal computer for your own benefit in this ready-to-use data base management program. BK1009 $11.95.*

SO YOU ARE THINKING ABOUT A SMALL BUSINESS COMPUTER—by Richard G. Canning and Nancy C. Lmeper. For a well organized manual on the process of selecting the right computer system for your small business, this text can't be excelled. Designed to introduce the novice in data and word processing to the real benefits of computerization, the book is filled with money- and time-saving tips, photos of equipment, lists of suppliers, prices, explanations of computer terminology, and helpful references to additional sources of information. Everyone contemplating a first computer installation should have this book. BK1222 $14.00.*

SOME COMMON BASIC PROGRAMS—Published by Adam Osborne & Associates, Inc. Perfect for non-technical computerists requiring ready-to-use programs. Business programs, plus miscellaneous programs. Invaluable for the user who is not an experienced programmer. All will operate in the stand-alone mode. BK1053 $14.99 paperback.

THEORY Z—How American Business Can Meet the Japanese Challenge—by William Ouchi. Why are the Japanese catching up and surpassing American industrial productivity? What allows Japanese industrialists to offer guaranteed lifetime employment to their workforce? This book will help you understand the Theory Z managerial philosophy and its implications for the American corporate future. Examples are given of the American industrial giants already operating under Z-style management and the impact of this style on the quality of their executives and workers is explored. A must for the alert businessman, large or small. BK1225 $12.95.*

*No C.O.D. orders accepted. All orders add $1.50 for first book, $1.00 each additional book, $19.00 per book foreign airmail. Please allow 4-6 weeks for delivery. Questions regarding your order? Please write to customer Service at the following address. Use the order card in this magazine or itemize your order on a separate piece of paper and mail to *80 Microcomputing* Book Department • Peterborough NH 03458. Be sure to include check or detailed credit card information.

For Toll Free Ordering Call 1-800-258-5473

80 NEWS

edited by John P. Mello Jr.

Data base bunko artist

UPS probing alleged scam on Compuserve

John P. Mello Jr.
80 Micro News Editor

Investigators at the United Parcel Service are probing complaints that a San Antonio, TX, man attempted to rip off Compuserve subscribers by getting them to respond to an electronic bulletin board notice advertising name-brand computer hardware at cut rate prices.

According to Alan C. Maskell, Jr., of Wallkill, NY, a notice appeared on the Compuserve bulletin board in April stating a David Bauer had computer wares for sale including two TRS-80 Model IIIs and software; Epson MX-80 printers; and a Diabolo printer.

Maskell ordered an MX-80 from Bauer through Compuserve's electronic mail. But as the package was being delivered in what appeared to be a factory-fresh carton to Maskell, UPS-Syracuse warned him it had been alerted by UPS-San Antonio complaints had been aired about Bauer's packages.

When the UPS driver opened the package for Maskell, he found the Epson box contained newspaper and two Coke bottles filled with syrup.

According to UPS officials, who wished not to be named because the firm was conducting an internal investigation of the matter, a person giving the name David Bauer shipped four packages—two to Tennessee, one to New York and one to Nevada—from San Antonio.

United Parcel received complaints from the Tennessee customers. One of them, a UPS official said, received a box containing newspaper and two bricks. The shipment to New York, Maskell's "printer," was intercepted in time. Apparently, the official added, the Nevada package was never delivered.

Once a customer pays cash on a COD, he or she must act quickly to stop the payment from reaching a seller. The time between putting the money in the UPS driver's hand and the carrier sending a check to the seller is about 24 hours. However, the San Antonio official said the Tennessee customers were refunded their money and UPS would attempt to recoup their losses through criminal prosecution.

Since being alerted of the alleged scam, Compuserve has suspended service to Bauer.

"We have reason to believe the address we have on file for this person [Bauer] is not accurate," said Lynne Gard, customer administration manager for Compuserve. "Plus there are some claims that he used our service in a fraudulent manner. So we have suspended his service until we clear up these matters."

Since he has been spreading the word on the apparent rip-off, his phone has "been ringing off the hook," said Maskell, whose Compuserve ID number is 70505,1123. He claimed the alleged scam could victimize as many as 10 percent of Compuserve's 23,000 subscribers. But Gard said, "To my knowledge, I know of less than five" complaints about Bauer. And a sampling by *80 Micro* of other San Antonio shipping outlets—the U.S. Post Office, Emory Express and Federal Express—unearthed no complaints connected to "David Bauer."

John Hanley of the FBI in San Antonio said no investigation of the matter had been opened yet, but he had been contacted by UPS officials and was awaiting more information from the carrier.

Gard of Compuserve warned the information utility's users to be careful when responding to mail order ads. She added: "We have a disclaimer up in the public bulletin board. We're going to enhance the wording so people understand it is their responsibility to check out who they are going to be purchasing from—much the same as a magazine ad or newspaper ad. The publisher is not responsible for the person who places the ad."

"I'd hate to have a situation give the bulletin board a bad reputation," she continued. "There are other people that post things on our bulletin board that are very reputable. We have not had any complaints about anybody else. I haven't run into this before and I've been with the firm since the beginning."■

SAT takes umbrage with critic who hikes student test scores

Karry Leichtman
80 Micro Staff

A critic of the College Board Scholastic Aptitude Tests—tests taken by every student wanting to enter an accredited American college or university—has miffed the originators of the tests, not by rapping them but by improving students' performances on the exams.

Until recently, students seeking an edge in the exams had two choices: thick study-guide books or classroom-style tutoring. Now there's a third: computer simulation. That approach has been very successful, according to an outspoken detractor of the SATs and chairman of the board at Krell Software Corporation of Stony Brook, NY, Dr. Edward Friedland. Friedland told *80 Micro* in a telephone interview: "The statistics compiled show roughly a 20-point score increase for students who have been tutored. Our studies show that students using our exam preparation series have score improvements that are much better than that."

Krell's advertisements boast a 70-point mean increase for students who used the initial preparation series. However an average increase of 140 points was reported in a limited survey of students at Hempstead High School, in Hempstead, NY. And more recently, an educator from a Detroit school district claimed one student's SAT scores jumped 250 points after being tutored by Krell Software.

It all sounds very impressive, but not everyone is happy. Friedland received a letter from the law firm representing the College Entrance Examination Board: "Our client has recently become aware that you are distributing a promotional brochure in which 'College Board' and 'SAT' marks are used to designate your 'Preparation Series'...Such use constitutes trademark infringement and unfair competition...The use is deceptive and misleading in that it creates the false impression that your organization and its products and services are affiliated with, or endorsed or sponsored by our client." Friedland was advised to refrain from further distribution of this brochure.

According to Russell Martin of the Examination Testing Service, the question is not over Krell's programs, but the relationship implied in the ads. When asked by *80 Micro* to comment on the dispute, Martin said, "I had sent a letter back to Dr. Friedland in March stating that his characterization of the relationship to ETS is inaccurate... as referred in an advertisement." When asked to elaborate Martin refused to comment further.

Friedland, on the other hand, said: "They are saying that I am misleading people into thinking that my preparatory series is somehow or another authored by them. I say, no person can read that ad and come out with that kind of conclusion. I make it abundantly clear that we are not the ETS or the College Board."

In an answer to the letter sent to Krell by the law firm—Greenbaum, Wolff & Ernst—Friedland wrote, "...we have no intention to misrepresent our product as being endorsed by or in any way emanating from your client. We will be glad to make this even clearer in our future advertising copy.... We utterly reject any suggestion that our present materials imply a relationship to your client's organization or that they misuse what you allege to be his trademarks. We believe instead, that you are attempting to suppress the distribution of our products."

"Part of their contention," Friedland said, "is that they own the word SAT and they own the word College Board, and nobody may take their name in vain. That I think is a little silly.... If I were to put an ad in a magazine to sell Cadillac hubcaps, to an extent General Motors owns the right to call a particular set of hubcaps Cadillac hubcaps. If I say I'm selling a hubcap for a Cadillac, it is very clear to everyone that I am not purporting to be the General Motors Corporation."

Despite his disagreement with ETS claims, Friedland changed his ads after the initial letter from Greenbaum, Wolff & Ernst. The ads now include a statement disclaiming any official ties between Krell and the College Board. But the statement wasn't good enough for the board. It said the attribution implied an unofficial connection.

The irony is Friedland has little desire to have any connection to the board or ETS: "I want the whole world to know that I have nothing whatsoever to do with the folks down there. I do not have a high regard for their product."

But what about other SAT peripheral businesses? How do they deal with the SAT and College Board trademarks?

The best known SAT preparatory text is *Barron's How to Prepare for College Entrance Examinations SAT*, a thick book rivaling the Manhattan Yellow Pages. No credits or disclaimers are given anywhere. Nor are they given in other SAT study guides.

Why does it appear Krell has been singled out? It might be because of Friedland's belief that he can write and administer a better standardized exam:

"The ETS has been taking an awful lot of flack from the academic community in several ways. One way, of course, is that nobody likes these standardized exams. They really don't test creativity of imagination, just booklearning and the like.

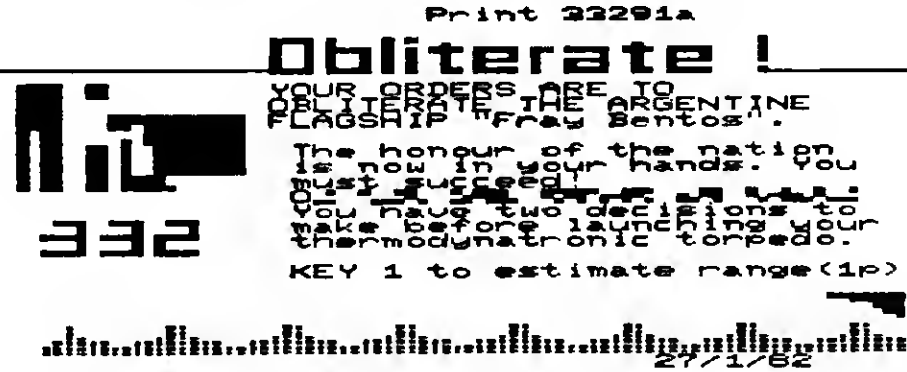
"I'm not too concerned with that because to be perfectly honest, I think I could do a better job than the ETS.... Usually after a test has been administered, there will be newspaper articles about their latest foul-up.

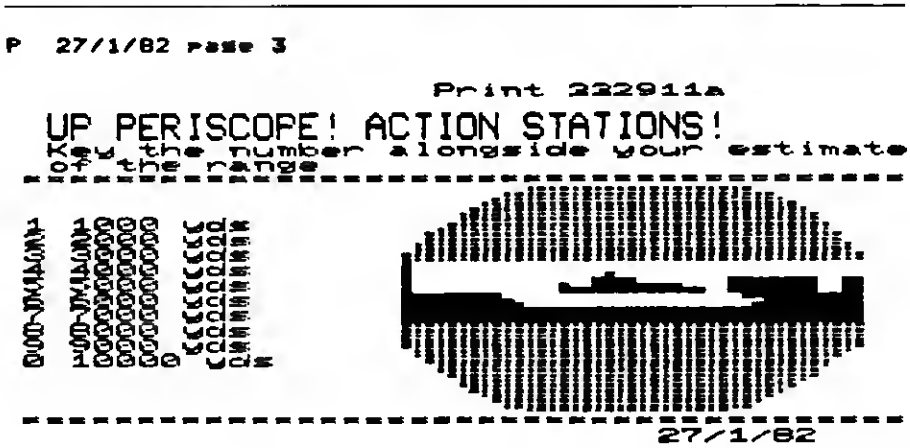
"I don't claim to be totally free of sloppiness, but I do claim that if I ran on a $100 million budget like they do, that I'd be a hell of a lot better than they are."

When reached by telephone for further comment, Martin neither confirmed nor denied the possibility of court action against Krell.

If it comes down to legitimate legal action Friedland said Krell will fight: "I think they're skating on very thin ice, trying to pretend to all sorts of rights which they, in fact, do not possess. [The] test certainly plays too large a role given the nature of the college boards.... I'd like to confront them directly and really let them have it. I would dearly like to meet them in a trial." ■

Video game on war in Falklands stirred up heated controversy in Britain





Early in the Falklands crisis last spring, videotext editor Gary Zabel found his electronic newspaper steeped in controversy—not over its coverage of the escalating confrontation between Great Britain and Argentina, but over a game called "Obliterate."

The game simulated a British submarine sinking the flagship of the Argentine navy.

Zabel, in a telephone interview with *80 Micro*, said Obliterate had been on the British data base service Prestel for nearly a year before the Falklands crisis. "When the situation began to brew up in the Falklands," he explained, "we changed the topic to become more up to date and topical. The user would assume the role of a British submarine commander with orders to destroy the flagship of the Argentine navy."

"It was very popular for a week," he continued, "but then it was criticized as possibly being in bad taste, in view of the delicate stage of negotiations."

He added: "The whole thing blew up because someone told an MP (Member of Parliament) about it and he described it as in bad taste. Then the whole press seemed to seize on the idea and it really blew up out of proportion."

Soon after the public questioning of the game's propriety, Obliterate was withdrawn from the system. "Our decision to withdraw the game," Zabel said in a statement, "caused great consternation among Prestel users—many of whom wrote us demanding it be brought back immediately."

In the phone interview with *80 Micro* Zabel, who originated the game with Bill Wadsworth, a friend and advertising salesman at the electronic newspaper, contended: "The game was designed to be fun and topical. We didn't want to give the impression that we were being mercenary in any way, trying to make money out of a delicate situation that was becoming worse every day."

Prestel, however, in a press release seems to be capitalizing on Obliterate's notoriety calling it "The game that made Prestel famous." And Zabel is quoted in the statement as saying, "I believe it [Obliterate] has gained more publicity for Prestel than any marketing campaign."

The editor of *Mercury 332*, the Prestel service of the St. Regis Newspapers in Bolton, UK, maintained the criticism of the game was unjustified. "There's a lot more happening in the world today to be critical of," he observed. "There are so many things on the market from war films to war games to comics about war. I don't feel guilty about the game at all."

Asked about the sinking of the Argentine cruiser Belgrano May 2—a real life fulfillment of the video game's scenario—Zabel replied: "It does feel spooky. I'm by no means a warmonger. The game was simply an idea. I think most people admit it was a brilliant idea to have a thing up to date and topical. It was good journalism, if you like, to bring your product to more people's attention by making it topical." ■

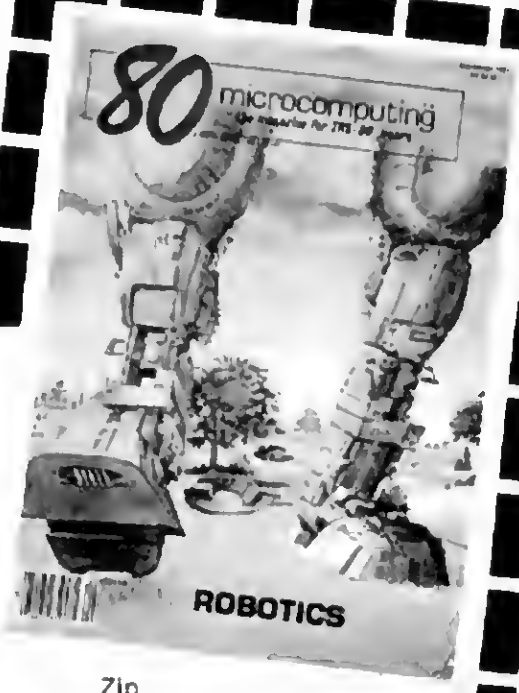
WHAT DOES 80micro DO FOR YOU?

the magazine for TRS-80* users

IT

- provides you with more information on your TRS-80* than any other single source
- gives you 20–30 new programs to use in each of 12 yearly issues
- reviews, equipment and software so you know what or what not to buy
- gives you the truth about the TRS-80—its good points and its limitations (*80 Micro* is not affiliated with Tandy)
- lets you save money—lots of it—by comparison shopping within the ad pages
- clues you in on how other TRS-80 owners are using and updating their systems
- lets you in on what is really happening in the industry
- brings you Wayne Green's outspoken and often controversial editorials every month
- and best of all it gives you a no risk subscription offer—

Subscribe today—If you are not satisfied with the first issue—write "cancel" across your invoice and send it back. The *80 Micro* is yours to keep.



YES I want *80 Micro*

☐ Bill me $24.97 for a year's subscription

Bill my ☐ AE ☐ MC ☐ VISA

☐ Check enclosed

Name _____

Address _____

City _____ State _____ Zip _____

Card # _____ Expire Date _____

Signature _____ Interbank # _____ 328B8

Canadian 1 year only/US funds $27.97 Foreign Surface 1 year only/US funds $44.97 (DRAWN ON US BANK ONLY. Foreign Air please inquire)

80 Micro • PO Box 981 • Farmingdale, N.Y. 11737

*TRS-80 is a trademark of *Tandy*

A robot that job shops

Computer and synthetic talk employed to aid job seekers

Job shopping? Let a robot sell you to a potential employer. How? Ask Joel Mannion.

Mannion, who's been programming for 15 years, has set up a job referral service in Cambridge, MA, using a computer and voice synthesizer acting as a robot. According to the 30-year-old president of Softwork Voyce, the robot headhunter represents the first time large vocabulary synthetic speech technology has been used in a system accessible to the public.

During its first six weeks of operation, the robot received 1600 phone calls, mostly from the curious, said Mannion, who was a computer consultant in the Boston area before getting involved with Softwork. "That accounts for why we have only 125 resumes," he explained. "Some people call up to see if this is a joke or not."

One of the service's aims is to help men and women find career advancement or first-time jobs in the computer field, according to a statement from Softwork Voyce. It also spares job seekers the psychologically difficult step of writing their resumes and cover letters.

To use the service, which is free to the job seeker, a caller dials 617-497-2323 from any push-button phone. The robot, called "The Voyce," solicits information about the caller's career goals, education, salary requirements and experience with particular computers, languages, data bases and multi-tasking. The caller responds by pushing buttons on the phone. A resume is written by The Voyce from the information and stored in its files.

Mannion: No joke.

The Voyce also saves employers the hassle of sorting through piles of resumes, while helping them locate programmers, technical writers, computer operators and information system managers.

When employers contact the computer, they describe the combination of skills they need and the robot searches its files for qualified applicants and recites their resumes. The matching process considers such things as commuting distance, employee's interest in relocating, and willingness to work on military projects. Part-time, full-time, temporary and summer jobs also can be handled by the robot. Resumes selected are printed and mailed to the employer for $20 each.

"The employee can find out if his resume has been forwarded but he can't find out who it's been forwarded to until that employer calls and lets him know," Mannion said. "This is a considerable savings for employers over a situation where someone sends them a resume. Both parties know the resume has been sent and just out of a sense of common courtesy, there's expected to be some sort of reply and there's an expense involved in that."

Asked if people might be turned off by the impersonality of a robot, the graduate of Carnegie-Mellon University responded: "People have been quite enthusiastic about it. They've called to tell us this is truly an amazing thing. They really enjoyed the experience of dealing with it. I really don't see that as a problem and it hasn't been one."

He added in a statement, "People will find communicating with the robot to be simple, relaxed and rewarding—a way to eliminate a lot of the confusion involved in finding a job."■

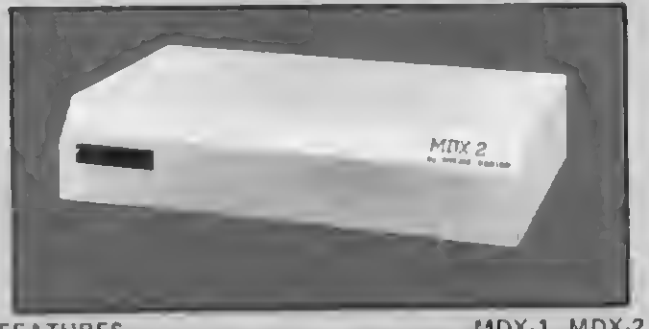
When You Opt For MICRO DESIGN You Get All The Options

INTERFACE EXPANSION SYSTEMS FOR THE TRS-80* COMPUTERS

The MDX Series Interface Expansion Boards provide a wide range of features for the TRS-80* Computers. Fully assembled units offer immediate, inexpensive expansion; or choose the bare or partially assembled units for even more savings. Since assembly of the board in sections is possible, you can build in the features you need, as you need them! P.C. Boards are solder-masked and silkscreened for easy assembly; each comes with the illustrated *User's Manual*.

TRS-80* Model I EXPANSION

Our MDX-1 and MDX-2 Interface Expansion Boards are field tested/field proven and offer more options for the Model I than any on the market. Also compatible with the PMC-80 and LNW 80 Computers. **Custom Case Available for MDX-2.**



FEATURES:	MDX-1	MDX-2
• MEMORY EXPANSION to 48K	✓	✓
• ON-BOARD SUPPLY, fully protected	✓	✓
• PHONE MODEM, 0-600 baud direct connect, "answer" and "originate" modes	✓	✓
• REAL TIME CLOCK software programmable	✓	✓
• PARALLEL PRINTER PORT	✓	✓
• SERIAL PORT RS232 and 20ma loop compatible	✓	✓
• EPROM OPTION for user firmware	✓	✓
• DUAL CASSETTE LINE	✓	✓
• FLOPPY DISK CONTROLLER The MDX-2 has all the features of the MDX-1 *plus* Floppy Disk Controller. The Controller is compatible with any single or double sided floppy disk drive that is configured for use with the TRS 80 computer		✓

ALL MDX SERIES BOARDS ARE WARRANTED AND SERVICE IS AVAILABLE.

TRS-80* Model III EXPANSION

The MDX-3 Interface Expansion Board is designed to mount inside the Model III Computer. Connectors provide external access to the Floppy Disk Controller (for external drives) and RS232 port.

FEATURES:

- DOUBLE-DENSITY FLOPPY DISK CONTROLLER—1.8 times the normal single density storage digital data separation, controls up to 4 drives.
- SERIAL PORT— RS232 and 20ma loop compatible, 110-19,200 baud
- PHONE MODEM—0-600 baud direct connect—"answer" and "originate" modes.
- FULLY COMPATIBLE with all Model III software

MDX-5: Also for the TRS-80* Model III

For the user who already has disk we offer the MDX-5. This board mounts next to the Floppy Disk Controller Board in the Model III.

FEATURES:

- SERIAL PORT—RS232 and 20ma loop compatible, 110-19,200 baud
- PHONE MODEM—0-600 baud direct connect "answer" and "originate" modes
- Fully compatible with all Model III Software

PHONE MODEM

The MDX-4 Phone Modem utilizes the same Direct Connect, 0-600 baud design as used in the other MDX series boards and answer/originate modes solder masked & silkscreened, on-board power supply Compatible with any RS232 port.

*TRS-80 is a trademark of Tandy Corporation

VISA MasterCard Accepted

For a free brochure contact

Our Expensive Expansions Are Not *Cheap*, They Are Inexpensive.

	MDX-1	MDX-2	MDX-3	MDX-4	MDX-5
Bare P.C. Board & User's Manual	$69.95	$ 74.95	$ 74.95	$ 29.95	$ 49.95
Fully Assembled		$399.95	$324.95	N/A	$224.95
Data Separator		$24.95			
Custom Case		$45.00			

Any manual ordered separately $5.95 plus $3.00 postage & handling
All board orders, add $5.00 for postage & handling. (Texas residents add 5% tax.)

MICRO DESIGN

OUR BUSINESS IS EXPANDING
EXPAND WITH US

P.O. Box 748
Manchaca, TX 78652

Dealer inquiries welcomed.

• Try Our Hotline (512) 282-0225

High Tech High in Silicon Valley

by Kerry Leichtmen
80 Micro Staff

Vocational training isn't what it used to be—at least in California's Silicon Valley. Paul Collins, superintendent of the Lost Gatos-Saratoga Joint Union High School District, had an idea: to expand its high schools' curriculum to include computer sciences and electronics.

Most schools offer computer study courses, but the courses Collins has in mind will be hard for other districts to duplicate. "I devised a two-track program. The lower track includes drafting, peripheral kinds of computer skills, repair work and a lower level of electronic training. For the upper level, meaning those who go in and get hands-on experience... would take courses that would lead to engineering and computer specialists."

To properly run these courses, which will be electives to the normal curriculum, the school will need computers: mainframes, minis and micros. They will need qualified instructors, and they will need intelligent kids able to take in the science, math and technical jargon that a person needs to know to survive in the Silicon Valley. According to Collins, the resources are available.

"We are 62 points above the scholastic aptitude mean national score," Collins told *80 Micro* during a telephone interview. "We have many national merit scholars, and on our own California competency testing program, we score in the 99 percentile in writing and in math, and about the 98th in reading and the 95th in spelling."

The type of machinery needed ordinarily would cost big bucks, more money than most school districts would be able to raise, especially in California's post-Prop 13 era. But, in the Silicon Valley, the checkbooks are open to Collins's high school. "We have people who have already written to us saying, whenever you need startup seed money we'll give it to you. They've already given us agreements saying whenever you need the mainframe we'll give you that. Others have said, don't you dare forget us, we want to be in this."

That takes care of the students and machinery; as for instructors, industrial cooperation is again the key. "They will do three things for us that would insure the product was what they wanted," Collins said. "They would either put on leave... people to teach in our schools... or would have people who are teaching in their in-service program teach some of our teachers, some of whom hold masters in computer science, and they would upgrade them to where they could be the teachers... Our teaching force would constitute about 40 percent and they would constitute about 60 percent."

Collins: Riding the wave of the future.

The benevolence Silicon Valley-based companies are bestowing upon Paul Collins and his school district is rooted as much in their own needs as in the students' needs for a meaningful curriculum. The Silicon Valley has become a very expensive place to live. As a result, it is becoming increasingly harder for businesses there to attract qualified employees. According to Collins, the average house costs $244,000. Industry's need for employees is so great that a few years ago they tried putting kids from the area's juvenile home into job entry positions. But, Collins said, their bad attitudes needed to be changed before they could learn computer skills.

Where Collins's program is most radical in its departure from normal public school operating procedure is the extent it allows outside interests in. "The heart of the whole program is that industry will be a full-fledged partner from the very beginning," Collins said.

"They would be appointed to a five member board made up of one member from the Fremont school board and one from the Los Gatos board, an industrialist appointed by each board, and an industrialist appointed by the two boards."

The concept has met with some resistance from concerned people afraid students will find the computer more fascineting than other subjects and activities. That is one of the reasons Collins decided the hi-tech school should be separate and elective from the rest of the school: "This is a separate school that will not be a comprehensive high school; it will not offer English; it will not offer math; it will not offer foreign language, nor social studies or any other subjects. They will take those subjects at their home base, so the kids will have their ties to their home schools, and they will get the fine teaching they've been getting all along. This extra school will only help them attain another instrument to help them do a better job."

The name for the school has not yet been decided. One choice is Institute of Computer Technology. Collins doesn't like that one as well as Computer Academy. But he realizes the idea is no longer his baby. There are many people and dollars involved, and he's decided either name would be good.

The school's name is the smallest aspect of Collins's vision: "The wave of the future is computers and technology. And I think it's not only going to be in the Silicon Valley and Route 128, but I also think it's going to be all encompassing and going to revolutionize education throughout the entire curriculum, and not just in computer science."■

TRS-80®
DISCOUNT

TRS-80 MODEL II
64-K 26-4002 **$3000**

TRS-80 MODEL 16
128-K 26-6002 **$4825**

8.4 MEGABYTE HARD DISKS (PRIMARY UNIT) $4000.

TRS-80 MODEL III
48-K 26-1066 **$1950**
16-K 26-1062 **$819**
WITH 2 DISK RS-232 TAPE VERSION
(ALL RADIO SHACK EQUIPMENT)

TRS-80 COLOR 16-K 26-3004 **$309**

16-K 26-3002 **$425**
32-K 26-3003 **$525**

COLOR DISK DRIVES
0 - **$475** 1-2-3 - **$315**

— T.M. TANDY CORP.

WE ALSO CARRY EPSON AND OKIDATA PRINTERS, XEROX 820 AND ALTOS COMPUTERS.
NO OUT-OF-STATE TAXES.

Sold with the manufacturer's limited warranty. Copies of such warranty may be obtained for review from Perry Oil and Gas Co.

DEALERS' INQUIRIES INVITED.

WE ACCEPT CERTIFIED CHECKS, CASHIERS CHECKS AND MONEY ORDERS.

PERRY OIL & GAS INCORPORATED

Suite No. A-1 137 NORTH MAIN ST., PERRY, MICHIGAN 48872
PHONE (517) 625-4151, MICH
FOR OUR PRICES, PLEASE CALL TOLL FREE **1-800-248-3823**

BEYOND-BASIC

```
10 REM          Beyond-BASIC In Action
20 GOSUB "CLEAR SCREEN"          ' See line 200
30 RESTORE 40 : DIM A(5) : MAT READ A
40 DATA  5,4,3,2,1                ' Data for array A
50 NU$="0123456789."              ' Allow digits only
60 INPUT LEN=3, USING NU$, "ACROSS";X
70 INPUT LEN=2, USING NU$, "DOWN";Y
80 PLOT (0,0)-(X,Y)               ' Draw a line
90 SHAPE$="PDPDPRPRPUPUPLP"       ' Define small square
100 INPUT USING NU$, "SCALE":A    ' 1=small, 4=large
110 INPUT USING NU$, "ROTATE":R   ' 0-360 degrees
120 PLOT (X,Y), S=A,R=R, SHAPE$   ' Draw the shape
130 DEF FNI (LO, HI, LOCAL N)     ' Define a function
140 INPUT "ENTER A NUMBER";N      '  to be this entire
150 IF N<LO OR N>HI THEN 140      '  subroutine
160 RETURN N : FNEND
170 PRINT FNI(1,10)+FNI(X,Y)      ' Input 2 nums, add
180 SORT A : PRINT "SORTED ARRAY: ";
190 MAT PRINT A; : DOS            ' Return to TRSDOS
200 "CLEAR SCREEN"                ' Named subroutine
210 CLS : POKE 3C00H, "BEYOND-BASIC DEMO"
220 MAT 1                         ' Ignore A(0) in MAT
230 RETURN
240 END
```

At last, a truly complete **Extended BASIC** for the TRS-80!

Beyond-BASIC Package I includes...
Line labels, RESTORE to any line, structured loops with WHILE/WEXIT/WEND, command abbreviations, multiple programs in memory, and much, much more.
Disk: **$49.99** Tape: **$39.99**

Beyond-BASIC Package II includes...
All this, plus super graphics, multi-statement user functions, extended line editor, DOS from BASIC and more!
Disk: **$64.99** Tape: **$49.99**

Beyond-BASIC Package III includes...
Everything in I and II plus array operations (including multi-key sort), cross reference, renumber
Disk: **$79.99** Tape: **$59.99**

Beyond-BASIC includes our 100+ page manual with index and summary.

Please write for additional information.
TRS-80 is a trademark of Tandy Corp.

Specify Model I or III. Disk or tape version when ordering. Send check, money order, or MC/Visa number to:

EXCALIBUR SOFTWARE

3336 Cascadia Ave S
Seattle WA 98144

See List of Advertisers on page 338

New micro by old name in business machines

Eye-catching graphics and unique disk formatting highlight Victor Business Products' first microcomputer, the Victor 9000.

At a recent press conference held in the plush Hotel Meridien in Boston, Victor officials modeled their new baby: a desktop micro with a 16-bit Intel 8088 microprocessor and 8-bit data path.

Victor Business Products President Edwin F. Carlson told reporters the firm's parent company, Kidde Inc., is grooming Victor to be "a significant force in business machines." That includes microcomputers and taking on the likes of IBM, Apple and Tandy, he added.

According to a statement from Victor, the 9000 compares favorably with its competition:

- Both the 9000 and IBM Personal Computer use 16-bit microprocessors;
- The 9000 RAM capacity—896K—is two times the capacity of the PC and Apple III and eight times the capacity of the TRS-80 Model II and Xerox 820;
- With its 1.2 megabyte capacity on two 5.25-inch floppy disks, the Victor machine has three times the capacity of the PC;
- While competitors offer only an 80 column spreadsheet, the 9000 offers 132-column format, which enables the spreadsheet to be read without horizontal scrolling; and
- The Victor micro's green phosphor CRT offers a resolution of 800 by 400, while the IBM's is 640 by 200.

Also, the 9000 has two RS232-C serial ports and a parallel port.

Software for the 9000 includes two operating systems (CP/M-86 and MSDOS) and six programming languages (C Basic, CIS Cobol, Pascal, Fortran, Basic and Cobol). Applications include packages for word processing (Victorwriter and Wordstar); financial planning (a Visicalc clone called Victorcalc); time management; accounting; installment lending; pharmacy management; and business equipment retailing.

The 9000, priced at $4,999, is aimed at businesses. According to the Yankee Group, a Cambridge, MA, consulting firm, annual shipment of microcomputers will reach 1.2 million in 1985 and 900,000 of them will be business computers. Of the 4.5 million micro-based systems in place by 1985, Yankee predicts, 3.5 million will be business systems. Observed Carlson: "The big market is not the hobbyist but the business market."

Because of its huge size, Victor contends, the small business market is more like the business machine market than the traditional computer market, or more like the application-driven market Victor is used to serving.

continued

MAKE & MODEL	Victor 9000	IBM PC	Xerox 820	Apple III	Radio Shack TRS-80 Model II
Processor Type	8088	8088	Z80A	6502	Z80A
Word Length	16 bits	16 bits	8 bits	8 bits	8 bits
Memory Size (Internal)	128-896KB	16-256KB	64KB	96-256KB	32-64KB
Storage Capacity on 2 Floppies	1200KB (5¼")	320KB (5¼")	184KB (5¼")	280KB (5¼")	960KB (8")
CRT DISPLAY					
Standard Format	80 x 25	80 x 25	80 x 24	80 x 24	80 x 24
Alternate Format	132 x 50	None	None	None	None
Graphics Resolution	800 x 400	640 x 200	None	560 x 192	None
Communications					
Built-in Serial Ports at no extra cost	2	0	2	1	2
Built-in Parallel Ports at no extra cost	1	0	2	0	1
Human Factors					
Keys on Keyboards	94-104	83	96	74	76
Detached Keyboard	Yes	Yes	Yes	No	Yes
Tilting Display mechanism	Yes	No	No	No	No
Swivelling Display mechanism	Yes	No	No	No	No
Desk Area Required (Approx. Square In. with 2 floppy disks)	310	420	470	361	500
Operating System Supplied Standard	CP/M-86 MS-DOS	None	None	Apple DOS	TRSDOS

NOTE: Chart based on manufacturer's information and Dataquest, Inc. available as of April 4, 1982.

What Did You Buy Your TRS-80 Computer For?

Probably To Make Things Easier.

Well, shouldn't the software you purchase unleash all the power of your computer!

Why spend hours configuring your system to do the things Multidos does automatically?

★ MULTIDOS ★

AUTOMATICALLY

INTERPRETS	a single key stroke to get a directory from the 'DOS READY' mode.
READS	standerd purchased copies of DBLDOS™, DOSPLUS, LDOS™, NEWDOS/80, and TRSDOS™. MODEL III and MODEL I - SINGLE and DOUBLE DENSITY
COMPENSATES	for CPU speeds of 1.77 MHz to 5.32 MHz even during DISK I/O.
DISPLAYS	the DIRECTORY (alphabetically) on the target diskette after a menu driven PURGE or COPY.
SENSES	the extra lowercase RAM chip and self-modifies to give you lowercase. (MODEL I)
CHECKS	for the same LRL before appending files.
EXECUTES	a machine language program under the control of DEBUG.
DETERMINES	if sufficient free space is present on the destination diskette before any writes are made during COPY.
CALCULATES	an effective TOPMEM for 100% complete DOS command execution from within BASIC.
MAINTAINS	the DATE on simple re-boots.
PREVENTS	a system hand — even without a diskette in drive zero.
DISABLES	interrupts when CLOAD, CSAVE, or SYSTEM is keyed in. (MODEL I)
TOTALS	the free space on all mounted diskettes.
DUMPS	graphics without any patches or system options.

AUTOMATICALLY ★ AUTOMATICALLY ★ AUTOMATICALLY

Coming Soon: 'EASY ZAP'!

— MAIL ORDERS —

Cosmopolitan Electronics Corporation
P.O. BOX 89
PLYMOUTH, MICHIGAN 48170

★★★★★★★★

— TECHNICAL INFORMATION —

Cosmopolitan Electronics Corporation
C/O VERNON HESTER
42403 Old Bridge Road • Canton, MI 48188 • (313) 397-3126

VISA & MasterCard
WELCOMED

Foreign Orders Add $10.00

★ For Model I Orders Only ★
Please specify Single, Double or P Density.

$79.95

Plus $3.00 For Shipping & Handling

Michigan Residents Add 4% Sales Tax

C.O.D. Orders Add $1.50

Personal Checks Take 2 Weeks To Clear

NOW AVAILABLE FROM

ABC SALES	COMPUTER SHACK	POWER SOFT	BYTES & NAILS	SIMUTEK Computer Prod., Inc.	MICRO PROG-80
13349 Michigan Avenue Dearborn, Michigan 48126 (313) 581-2696	1691 Eason Pontiac, Michigan 48054 (313) 673-2224	11500 Stemmons Expressway Dallas, Texas 75229 (214) 484-2976	5110 6th Avenue Sioux City, Iowa 51106 (712) 274-2348	4877 East Speedway Tucson, AZ 85712 (602) 323-9391	P.O. Box 606 Sunnymead, CA 92388 (714) 653-9429

TRS-80 is a registered trademark of Tandy Corp.

58

See List of Advertisers on page 338

VICTOR*continued*

The firm has been doing business for 65 years and is well-known for adding machines, comptometers, electronic calculators, programmable calculators and cash registers. But will that reputation hurt Victor's image in the high tech marketplace? It thinks not. "There is hardly a business person who doesn't recognize the Victor name and identify quality office products," it said in a statement.

Victor said its standing as an existing distributor of business products has other advantages. It has in place one of the largest sales organizations covering the office market. To create such a distribution system from scratch would take years and cost millions, it argues. It also has established a large service network. One of the most common criticisms of any growing company in any market sector, it noted, is it fails to serve its customers.

"We also benefit from the many years of experience our company has in working with dealers," Carlson said. "We understand the level of support they require, and we know how to provide it."

Yankee Group reports GEISCO to offer e-mail to public this year

A major provider of electronic mail will offer its services to the public by the end of 1982, according to a statement by the Yankee Group.

The Cambridge, MA, consulting firm, announcing its latest issue of "Report on Electronic Mail," said the General Electric Information Service Company intends to convert its private, subscriber-based timesharing network to a public network for electronic mail and other data processing services.

Yankee forecasted spectacular growth for most electronic mail vendors over the next few years followed by a mid-decade shakeout by providers of the least functional and least user-friendly systems.

It estimated GEISCO, with 20,000 mailboxes, has 41 percent of the existing electronic mail market. Other firms holding a share of the e-mail market are Dialcom with 12,000 mailboxes and 25 percent of the market; Telemail with 8,000 mailboxes and 16 percent of the market; and Comet, Infoplex, and Ontyme II, each with 3,000 mailboxes and 6 percent of the market.

General Electric's competitors will be integrating their electronic mail and data base services, Yankee added. It said this year Computer Corporation of America will integrate in stages its Comet electronic mail and Model 204 data base management system into a new product called DBMS/OA (Data Base Management/Office Automation). Dialcom, Telemail and Ontyme II also plan electronic mail-data base integration moves, the consulting firm noted.

It maintained most of the electronic-mail firms support government standards allowing their systems to interface. Yankee predicted increased user interest in communication between systems.

General Electric doesn't entirely agree with Yankee. "We view our message systems as primarily private systems," observed Tom Bijou, program manager of GEISCO's electronic mail service. "We don't have any clamoring market demand to modify our system to meet a national standard."

He explained GEISCO's clients are mostly large corporations—Fortune 500 companies—that spend $50 to $100 a month on e-mail.

"We're not opposed to a standard," he said, "but we're not making any moves to incorporate that standard in our product. We are putting features in our product that our customers are telling us are important to them."

He added: "It's way too early to say we should follow standards or what the standards should be. The market is so immature."

Referring to the do-your-own-thing approach that has been one of the cornerstones of International Business Machine's success, Bijou noted: "I think Yankee would like to draw a parallel between GE's philosophy and IBM's. We're not trying to do that."

Yankee also said its report covers software interfaces between e-mail providers and users' computer systems. It noted some providers are ready to sell their e-mail software to clients who want to add an in-house system. "Comet already has some significant customers for its software," the company's statement said, "while Telemail will license its software to DEC and IBM users by late 1982."

"Report on Electronic Mail" is published quarterly by Yankee. Annual subscriptions cost $650. ■

Transform your Home into a Computerized Arcade with HORIZONS Software

NEW!

VENTURE

Journey into the derelict stronghold of an ancient wizard in an effort to destroy monsters and collect treasure in this realtime machine language arcade game. With sound effects, this is the first in a series of outstanding quality arcade-style games for your TRS-80 computer.

Please specify Model I or Model 3 when ordering.

Tape $14.95 / Disk $19.95

TRS-STICK Joystick for all Horizons games: Model I or 3: $39.95

A Division of Case Technology

HORIZONS Software

P.O. Box 4792
Springfield, MO 65802

Dealer inquiries invited
TRS-80 is a trademark of Tandy Corp
Please add $1.00 for handling MO res add 6%

VISA MasterCard *(417) 831-5673*

✓373

The Platinum Worksaver©

...Programming Made Easy

With the Platinum Worksaver©, programming time and hassle can be cut by 50%.

FULL SCREEN EDITING OF BASIC PROGRAMS

With the PLATINUM WORKSAVER'S editor, there's no more counting the numbers of characters to delete or change, or wondering if you deleted too many or too few. You see the whole line as it's edited. Changes, deletes and inserts are automatic and the cursor can be moved anywhere on the screen.

FULL SCREEN EDITING OF NUMERIC AND STRING ARRAYS

But that's only the beginning! The editor (Written in machine language) also comes with a short, two line BASIC subroutine that will allow you to use the full screen editor on your numeric and string arrays. This is the springboard you need for developing your own VisiCalc™ or word processor.

NUMERIC KEYPAD

We've solved another Color Computer weakness. Press a control key and letters J, K, L, U, I, O, P become number keys 1-7. Numbers 8-0 remain in their normal positions. The key pad numbers are clearly labeled on the overlay.

SINGLE KEY ENTRIES OF BASIC WORDS

So, the PLATINUM WORKSAVER makes it easier to write useful programs and edit them, but that's not all! Entering programs is a breeze with single entry of over 90 basic words, on a beautifully designed KEYBOARD OVERLAY, color-keyed to function. No need to memorize or consult a conversion chart to find a word.

PROGRAM CHAINING AND DYNAMIC DEBUGGING

Now you can write, enter and change programs easily, but what about debugging? This is the frustrating, time consuming aspect of programming and frankly, the Color Computer doesn't help you much . . . you have to start the program over each time you make a change. But not with the PLATINUM WORKSAVER!! With it you can change, delete, add and rearrange or join lines. The special reserved key is excellent for copying or moving parts of lines to other lines . . . plus, you can even LOAD A WHOLE NEW PROGRAM without disturbing the data you've created.

A COLOR COMPUTER* MACHINE LANGUAGE ENHANCEMENT PACKAGE THAT PROVIDES:

- Dynamic full screen editing of BASIC programs.
- Dynamic full screen editing of numeric and string arrays. The advanced user will be able to write VisiCalc™, word processor etc.!
- Single key entries for 80 commands and functions.
- Functionally laid out plastic keyboard overlay.
- Numeric Keypad conversion.
- Automatic line numbering.
- Best value per dollar than any other enhancement package available.

THE PLATINUM WORKSAVER INCLUDES:

- *Enhancement program, including a sample mini-word processor, on a high-quality Agfa Cassette.*
- *Fully labeled acetate keyboard overlay*
- *Complete instructions*
- *Loads in seconds, takes less than 2K*

The PLATINUM WORKSAVER costs $30.00 plus $3.00 S&H (NY residents add 7% tax). To order write:

PLATINUM SOFTWARE
P.O. Box 833
Plattsburgh, N.Y. 12901
Phone orders: (518) 643-6796

VISA, MASTERCARD ACCEPTED. PERSONAL CHECKS TAKE 2-3 WEEKS TO PROCESS. All orders shipped within 24 hours.

platinum software

You're Serious About Your Color Computer,* SO ARE WE.

✓544

*Color Computer & TRS-80 are registered trademarks of Tandy Corp.

**$30.00 plus $599 suggested price for 16K Color Computers (we do not sell the computers).

✓See List of Advertisers on page 338

photos by Kary Lechman

Micro fair staged at NH school

Twenty-nine vendors—like the one from Educational Activities Inc. in the photo on the left—showed off their wares at the microcomputer fair held at the University of New Hampshire-Durham in May as part of the Granite State's Computer Education Week.

Among the vendors were Apple, Commodore, Atari and Digital. Although Tandy wasn't represented among the exhibitors, fairgoers, like the two in the photo below, could experience a TRS-80 in the hands-on workshop.

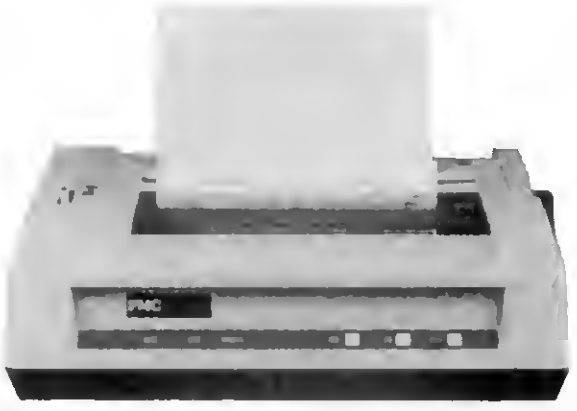
Teachers, administrators, students and computer enthusiasts were treated to lectures, seminars and panel discussions on Logo, Pascal, how to select software, networking, word processing, programs for young children and gifted students, and applications for specific subjects.

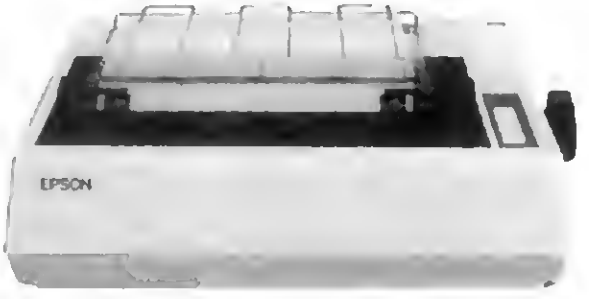
The fair was sponsored by the New Hampshire Association for Computer Education Statewide. ■

There is no comparison in PRICE*

DMP-85 vs MX-80

we offer better features!





our DMP-85

- Friction Feed - Standard
- 120 cps
- 2 proportional fonts
- 1.3K buffer (screen)
- Mix fonts on any line
- Paper cut off 1" from last line
- 5 alphabets
- 6 channel VFU
- Bit Image Graphics - Standard

their MX-80

- Friction Feed - Optional
- 80 cps
- None
- 1 line buffer
- Limited to same font per line
- Longer: wastes paper
- 4 alphabets
- 1 channel VFU
- Bit Image Graphics - Optional

*Available for immediate delivery with attractive discounts for dealers and distributers.

See us at COMDEX booths 746 to 848.

PMC Personal Micro Computers, Inc.
475 Ellis St., Mtn. View, CA 94043 (415) 962-0220

242

See List of Advertisers on page 336

PULSE TRAIN

Green light given Tandy on Memorex deal

After completion of an investigation lasting nearly six months, the Federal Trade Commission has okayed the Tandy Corporation's purchase of the Consumer Products Division of Memorex.

The commission began its investigation of the deal last October because of possible anti-trust implications. The original deadline for a commission ruling was Jan. 25, but no word came from the panel until the end of April. Then it said it had completed its investigation and planned no further action.

The deal makes Tandy the only domestic producer of video cassette tapes and for the first time, places it in the video cassette market, according to *Electronic News*. That newspaper added the transaction raises speculation Tandy, which has been unsuccessfully marketing a video disk player, will become an original equipment manufacturer of video cassette recorders.

According to a statement from Tandy, the acquisition has been made retroactive to April 1. The reason for that, EN reported, was to make the purchase coincide with Tandy's fiscal calendar.

Tandy's Director of Financial Planning Garland P. Asher told EN the Fort Worth, TX, corporation will immediately acquire the Memorex tape production plant in Santa Clara, CA, and will retain the nearly 800 employees who had been working for Memorex.

In Tandy's statement on the deal, it said international subsidiaries of the division will be acquired by Tandy as permission is received from the governments of Canada, United Kingdom, France, Germany and Italy.

"Basically," Asher told EN, "we're going to continue the Memorex business just as it has always been done."

Flip in floppy prices

Pressure from Japanese disk-drive manufacturers should cause significant erosion in the price of 5.25-inch disk drives, according to *Electronic Buyers' News*.

The newspaper said the Japanese are selling boardless drives for as low as $55 and board versions for $100. Tandon, which does much of its production in India, it added, is expected to unveil a $50 floppy for the U.S. market by mid-year.

The Remex Corp. told EBN the price of the firm's double-sided, 48 tracks-per-inch RFD480, now selling for $225-$230, could drop to $200.

According to EBN, Robert Katzive, vice president of Gnostic Concepts' computer division, agreed the boardless drives were having an effect on the marketplace, but long-term floppy buyers will probably choose floppies with boards. He warned, "Adding arbitrary read-write electronics could get you into some trouble."

It seems more than just computerists are attracted to the TRS-80. Ask Kathy McMasters of Brattleboro, VT, who took this photo of her cat China White.

Choose publisher carefully, softwriters told

"Look for strong technical competence and marketing ability in a software publisher, or the computer program you hope to sell may never get off its floppy disk," according to Fred Pood, senior vice president of Micropro International Corporation, producers of Wordstar.

Speaking at the West Coast Computer Faire held in San Francisco in March, Pood added: "It's been our experience that authors all-too-often spend an inordinate amount of time perfecting a program, adding all sorts of bells and whistles, while others have brought out a product in simpler form and snatched away the market."

"Too many prospective authors," he said, "have come to us looking for a large percentage of a product's selling price. What they may not initially realize is that the technical and marketing abilities we bring to bear on a product can offer the chance of vastly greater sales and thus much more in royalties than if the author went it alone."

The man in charge of software acquisition at Micropro said programmers should expect as royalties 10 percent to 20 percent of a publisher's revenue from a program. In some cases, he added, that could make the programmer a millionaire.

Pood gave softwriters some tips in appraising a publisher:

- Look at the firm's track record in designing, developing and documenting its programs;
- Check its ability to produce detailed reference manuals and concise training guides for users;
- Determine the size of the company's sales force and number of sales support offices;
- See if it plans to give your software high visibility through a multifaceted

continued

PULSE TRAIN*continued*

marketing program, including research, pricing, packaging, public relations, advertising, trade show promotion and point of sale cooperative arrangements;

- Note if it offers strong legal protection to counteract software piracy and protect your interests; and
- Assess its manufacturing, shipping, distributing and accounting operations.

David Ferris, an industry consultant and entrepreneur, warned softwriters to polish their negotiating skills when readying themselves to deal with publishers and to spend $2,000 on a good software lawyer.

For softwriters thinking of self-publishing, Jackie Morby, a partner of TA Associates—the nation's largest venture capital firm—said an initial outlay of $25,000 was necessary before money began flowing back to a programmer.

Brits want home shopping

A market study of commercial videotext usage shows British consumers are eager to see classified and other advertising and are willing to pay for it, *Editor & Publisher* reported.

The newspaper trade journal said the study showed 60 percent of the videotext users regularly look up classifieds and more of them would like to see the ads expanded.

The study on Viewtel 202—the most popular supplier of information on Prestel, the British videotext system, and the world's first advertiser-supported electronic newspaper—also showed videotext users would like to do more shopping from their home terminals. Often-cited categories of merchandise consumers said they wanted to buy were electrical goods and books. There was also overwhelming support from users for buying goods with credit cards.

Gary H. Arlen, president of Arlen Communications Inc, the Washington, DC, firm distributing the Viewtel 202 report in the United States, told E & P: "The European findings are easily translatable to North American audiences. The report includes valuable ideas and interpretations about how to develop information and business services for potential videotext customers."

Michigan software house runs top games list

There's the *New York Times* bestseller list and the American Top 40 and now there's Gordon Monnier's Top 10 Games list.

Monnier, owner of the Computer Shack, a software house in Pontiac, MI, said he got the idea for his top 10 (published for the first time in the May issue of *80 Micro*) after seeing an Apple dealer do it in an issue of *Infoworld*. He thought it was a good idea "because a

COMPUTER SHOWCASE EXPO HELD IN BOSTON

Small-and medium-sized computers were displayed for three days at the Computer Showcase Expo held this spring in Boston. Here a crowd gathers around a drum filled with cards made out by thousands of expo visitors as a robot chooses Harold Solomon, M.D., of Boston as the winner of a $3,000 computer system. The expo was sponsored by The Interface group of Framingham, MA, the world's largest producer of expositions and conferences for the computer industry.

PULSE TRAIN *continued*

lot of people call me up and ask me what games I like and what's a good game."

Every month, Monnier and four other ardent game players make their choices and the top 10 are published in a Computer Shack ad.

Monnier said he is trying to get more of his customers to participate in his rating game. "It's hard to find guys who will sit down and send you a listing of their games," he noted. A lot of them say they'll do it and they never do. Anyone that buys a lot of stuff from us, I tell them if they'll send us a listing every month, we'll count them in."

Olivetti expects killing with 16-bit micro

Olivetti, known for its snazzily-designed typewriters, expects to make a killing in the European market as the first major Old World company to release a personal computer.

According to the *Providence Journal*, the Italian firm predicts it will sell 110,000 of its 16-bit M20 microcomputers in Europe by the end of 1983, substantially shaving Apple's and Commodore's share of the European market.

The M20 was developed at a cost of $5 million at the Olivetti Advanced Technology Center in Cupertino, CA. It has nine keyboards, making it as easy to use in Japan and France as in the United States. The M20's pricetag is between $3,000 and $10,000 and is designed for small businesses.

The *Journal* noted at least one of Olivetti's competitors is skeptical of the company's success claims. Said Fred Hoar of Apple, which owns 20 percent of the European personal computer market: "The idea of Olivetti suddenly jumping in and grabbing a large portion of our market share in Europe is very unlikely."

Computer used to stiff ad agency of $24 million

The nation's second largest advertising agency—J. Walter Thompson—miscounted $24 million in revenue because one of its divisions doctored computer entries to make it appear it was reaching its annual goals.

According to *The Wall Street Journal* starting in 1978, phony computer entries made it appear that the agency's barter syndication unit had met its goals. Higher goals were set for 1979. When the 1979 goals weren't met, more bogus revenue was booked, resulting in even higher goals for 1980. And so the cycle continued into 1981.

Barter syndication involves an agency buying tv programs from independent producers and swapping them for commercial time on a tv station. This builds up a "bank" of spots for the agency with the station. The agency then sells the spots to blue-chip clients, usually at a discount.

The newspaper reported former employees of the unit said its computerized accounting system was riddled with what appeared to be erroneous entries, so much so that the employees sometimes had to resort to keeping their own records.

During JWT's investigation of the unit, the agency received more than 200 responses from stations, the majority of them disclosing substantial discrepancies between station records and time-bank numbers stored in JWT's computer.

Former buyers for JWT interviewed by the *Journal* said when time banks mysteriously appeared in printouts as having been earned, New York shrugged off the discrepancies as computer failure and sometimes took the position that the shortfalls could easily be made up in the future with a little extra effort.

Officials at JWT said fictitious time banks were created and fictitious clients used in fictitious spots. To prevent unexplained paper—bills, receipts, checks—from being sent clients and stations, the perpetrators of the scheme used the computer's "test estimate" function.

Test estimate uses fictitious client codes to determine "what-if" situations in various markets. Through a complicated series of steps, the schemers got the computer to treat the test estimates as real accounts and rolled them forward month after month.

Agency officials told the *Journal* no money had been stolen and clients weren't improperly billed. But while the unit was exhibiting its glowing sales record, the company poured $30 million into it, buying tv shows like "The Osmonds at the Ohio State Fair" and "Vic Damone on Campus" to barter with stations. That money will never be recovered, the officials said.

Exec calls for empathetic interfaces

If computers are to penetrate the managerial and professional market, they must reflect the user's, not the machine's, point of view, according to Joseph Adler of Integrated Office Systems of San Jose, CA.

continued

For TRS-80 Models I and III

Introducing the Lowest Cost Hard Disk System Ever . . Laredo's LS525.

$1995*

5 million low cost bytes of on-line storage.

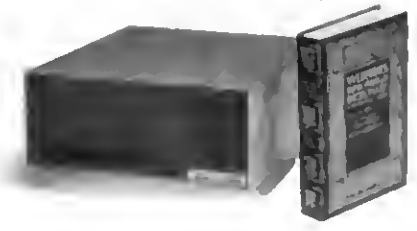
At $1995.00 affordable hard disk storage is now within your reach.

The LS525 hard disk system is easier to use than your printer . . . just plug it in, switch it on and your disk storage problems are over forever.

The LS525 gives you unheard of speed and reliability. For starters we built a "mainframe like" controller that can detect disk surface defects and relocate the data to alternate tracks. Talking about speed, the LS525 can access files 10 times faster than your floppy.

This coupled with proven "winchester" technology is what we mean by reliability and speed.

We also provide a user-friendly TRSDOS compatable operating system in which all of your existing software can run on. It provides features that can make the LS525 look like one big 5M byte drive or four small 1.25M drives or whatever you like.



The LS525 is a compact (less than one half cubic foot) "color keyed" package that will fit perfectly next to your TRS 80. So if your tired of seeing "Disk Space Full"

there's no excuse.

Call toll free and order yours now.

(800) 538-5137

Inside California call (408) 980 1888

* Model I or III host adapter $250 & LDOS $160 extra, specify when ordering
(LDOS includes hard disk driver and Formatter)

laredo systems inc.

. . .mass storage for personal computers.

Laredo Systems Inc. 2264 Calle De Luna, Santa Clara, California 95050

153 TRS-80 and TRSDOS are trademarks of Radio Shack a Tandy Co

See List of Advertisers on page 338

PULSE TRAIN *continued*

Speaking at the Office Automation Conference held in April in San Francisco, the vice president for humen systems said: "Professional working life is a dynamic process end e computer system which truly enhances effectiveness must respond to the user's environment and not constrain his behavior through the machine's own inherent limitations. A system meeting these requirements can be called empathetic because it reflects the world view of the user and responds accordingly."

"Achieving empathetic interfaces," he continued, "demands that system designers have a profound understanding of the needs, personality end work habits of the user. Pure functionality is no longer an adequate selling point as it was for technical end clerical users."

He added: "Executives ere not in the habit of changing their ways for the seke of greater productivity. Although they strive for power and professional excellence, they are conservative in neture and do not employ the latest in office autometion, choosing instead to use tools with which they are satisfied and comfortable."

To be attractive to management, he noted, new systems need three features: They must be useful immediately, speek the user's language, and "be packaged in such a way as to connote the appropriate status and symbolism."

Micro vitals in new directory

Vital information on the microcomputer industry will be included in *The Microcomputer Merket Plece* expected to be published next month by Dekotek Inc. of New York City.

The directory will contein key personnel, number of published software programs, application areas of interest, hardware served and a selection on how individuals can submit new programs for publication. It will also provide e list of magazines and newsletters serving micro owners, exhibits and shows, user groups by region, suppliers to the industry and associations.

The guide will retail for $145, but can be obtained for a special pre-publication price of $95 from Mike Hopkins, Dekotek, P.O. Box 1863, Grend Central Station, New York, NY 10022.

Records on the record

One of the most sophisticated record information systems in the world is up and running on Canada's Telidon videotext system.

The Canadien government expects to locete Telidon terminals in record stores, radio stations, libreries and educational institutions where people may access the cetelog.

There are 80 information fields on each record in the data base including performers' biographies, labels, publishing rights and licenses and a host of distribution end management information. Also, because of Telidon's graphic capabilities, e person mey call up color images of a record's jacket-cover end photos of recording artists.

The bilingual catalog contains more than 1,000 entries. It was prepared by the Canedian Independent Record Production Associetion end l'Association du Disque et de l'Industrie du Spectacle Quebecois. It wes funded through matching grents from the federal Department of Communicetions end the Canadien Radio-Television end Telecommunicetions Commission.

Author of *Soul* garners Pulitzer and ABA, bids computers farewell

Trecy Kidder, who made high technology into e bestseller with his *Soul of e New Machine*, captured a Pulitzer Prize and American Book Awerd in April, but he eppears far from enamored with computers.

In an interview with the *Boston Globe*, Kidder, whose book has sold more than 100,000 copies, opined: "I don't like the mystique about computers. The computer sociology [implied by] the word 'revolutionary' annoys me. I am gled to see them treated realistically. After ell, they are just machines."

Soul (reviewed by Chris Brown in *80 Micro*, December 1981) received the Pulitzer and ABA in the general non-fiction category. The paperback rights sold for $250,000 and Avon Books expects to release the softcover version this month. Columbia Pictures has taken en option on the book to turn it into e movie.

Kidder, who lives in Williamsburg, MA, told the *Globe* he's not planning a *Soul II*: "I've bid the world of computers farewell. It has taken me six months to get it out of my system and I am ready to move on to something else."

Atari distributor chosen

The world's largest distributor of personal computer software, Softsel Computer Products Inc., has been chosen by Atari Inc. to be the first softwere-only distributor of the Warner Communications' firm computer programs.

Softsel will carry the entire line of software developed by Atari for its 400 and 800 home computers. The Inglewood, CA, company's 1500 dealers, which now provide 1200 personal computer programs, will provide a signiticant increase in distribution for Atari's growing catelog of programs in education, entertainment, home, office and personel manegement.

Paying for failing to connect

Call monitoring computers at two long-distence rivals of Ma Bell have a disconcerting habit, according to *The Wall Street Journal*: They charge for calls made but unenswered.

Officials from the two companies—MCI Communicetions Corp. end Southern Pacific Communication Co.'s Sprint—conceded to the *Journal* there ere occasional billing errors, but blame it on AT&T.

They explained American Telephone and Telegreph's enswer supervision system rerely mekes e mistake because when a call is answered, an unambiguous signal goes directly to the computer that compiles the bills. The competitors' computers do not receive a direct signal, but monitor the ringing pattern of a call. That pattern can be disturbed by noise on the phone line and be interpreted by the computer as an answered call. The longer e caller lets an unanswered phone ring, the greater the chances he or she will be billed for the call.

Despite the problem, the competitors told the *Journal*, their billing systems work more often than not. They added the pending AT&T anti-trust settlement will require Ma Bell to provide its competitors with services identical to its own, including enswer supervision.

Meanwhile, however, at least one customer said he's going back to Me. "At least we have faith in their bills," he told the *Journal*.

Disk-controller firm wins trade secrets case

The largest independent producer of disk controllers in the nation has won a $1.4 million trade secrets lewsuit against two former employees.

continued

4 MHz FOR THE MOD 3

PC BOARD & DOC. ONLY $19.95

THIS EASY TO INSTALL KIT WILL DOUBLE THE SPEED OF YOUR MODEL III COMPUTER.

COMPLETE KIT $59.95

ASSEMBLED & TESTED $99.95

CALL OR WRITE
J.E.S. GRAPHICS
P.O. BOX 2752
TULSA, OK 74101
PHONE (918) 742-7104 ✓202

IEEE-488 TO TRS-80* INTERFACE

Everything needed to add *powerful* BASIC GPIB-488 controller capability to TRS-80 Model 1 or 3, Level 2 or DOS with a minimum of 16K.

488-80B
For Model 1 Operation

488-80C
For Model 3 Operation

Model 488-80B or 488-80C Price: $375.
+ shipping, insurance & tax
WHEN ORDERING SPECIFY DISK OR TAPE

SCIENTIFIC ENGINEERING LABORATORIES
11 Neil Drive • Old Bethpage, NY 11804
Telephone (518) 694-3370 ✓203

*Trademark of Tandy Corp.
There is no affiliation between Scientific Engineering Laboratories and Tandy Corp. or Radio Shack

Data Acquisition and Control for the TRS-80* $230 ppd.

The STARBUCK 8882 is a complete eight channel data acquisition and control system, plug compatible with the Model I Level II TRS-80. It includes 8 protected analog inputs (0-5 Vdc with 8 ± 1 bit accuracy), 8 protected digital inputs, 8 optoisolated digital outputs, and two joystick ports. Interrupt-driven software package allows **simultaneous** data acquisition and storage while using the TRS-80 for any other purpose!

Application manual covers home security, energy monitoring, weather station use, appliance control, graphics and games. Price includes case, power supply, extra expansion card edge connector cable, complete software package and detailed applications manual. Manuals only are available for $5.00 ppd. Model III version $250 ppd. To order, write or call

STARBUCK DATA CO.
P.O. Box 24, Newton, MA 02162
617 237-7695 ✓205

Massachusetts residents add 5% sales tax. *TRS-80 is a trademark of Tandy Corp.

OPTIONS-80, NOW FOR APPLE* & TRS-80*

OPTION INVESTING

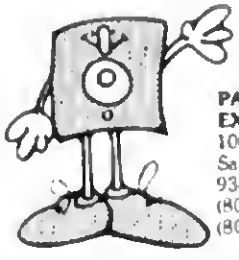
PROGRAM ANALYSES RETURN FROM LISTED STOCK OPTION INVESTING

HANDLES CALLS, PUTS, SPREADS, IN AND OUT; COMMISSIONS, RISK, COST OF MONEY, DIVIDENDS. TABLES AND GRAPHS. PRINTS, STORES TO DISK. INDEXED MANUAL & COMPLETE GUIDE TO OPTION INVESTING. M/C & VISA. $125. SEND FOR FREE BROCHURE.
OPTIONS-80, BOX 471
CONCORD, MASS 01742
*TRADEMARK TANDY CORP. *TRADEMARK APPLE COMPUTER, INC.

- Professional -
REAL ESTATE SOFTWARE

Verbatim flexible disks

Call Free **(800) 235-4137** for prices and information. Dealer inquiries invited. C.O.D. and charge cards accepted.



VISA

PACIFIC EXCHANGES
100 Foothill Blvd.
San Luis Obispo, CA
93401. In Cal. call
(800) 592-5935 or
(805) 543-1037.
✓207

DISCOUNT TRS-80™ Model I & III External Mini Disk Drives

- Tandon 40 Trk Disk Drive, w/pwr supply & case . . $259
- Tandon 40 Trk Bare Disk Drive $220

- Verbatum Data Life (Box of 10) $29
- 2 Drive Cable, Model I or III $24
- 4 Drive Cable, Model I only $34

ORDER NOW—TOLL FREE

We accept Master Card, Visa, cashier's check, & money orders. **120 DAY WARRANTY & FREE shipping & handling** on orders delivered in continental U.S. For Foreign, FPO or APO orders add 15% for shipping. Texas residence add 5% sales tax. TRS-80 is a Trademark of Tandy Corp.

CompuAdd Corp.
13010 Research Blvd.,
Suite 207
Austin, Texas 78750

800-531-5255 all states except Texas
800-252-9146 for Texas residents
[illegible] ✓209

For info call: 512-250-1523

✓See List of Advertisers on page 338

PULSE TRAIN *continued*

According to David Goss, the attorney for Microcomputer Systems Corporation of Sunnyvale, CA, the case by a California Superior Court judge represents the first time a substantial judgment has been awarded in a high technology business confidences lawsuit.

Microcomputer Systems filed its suit against a firm, Data Technology Corporation, established by two former employees, David Tsang and Lloyd Ebisu. In a statement, Microcomputer Systems maintained Tsang and Ebisu used confidential information gained at the Sunnyvale company to construct their disk controller used to land a fat contract with Shugart Associates.

Microcomputer Systems Chief Executive Officer James S. Torenson noted: "The judgment is more than a victory for MSC. It is a landmark victory for all companies concerned with protecting their proprietary information."

Keeping the jerks off talk radio

Radio stations with talk shows are finding having a computer hobbyist on the staff can be useful.

Stations in Chicago and Phoenix have microcomputer set-ups designed by hobbyists and aimed at screening calls to their talk shows, according to the computer industry newspaper *Infoworld*. Some people at the stations have dubbed the programs "jerk-finders" because they allow talk show hosts to keep people they don't want to talk to off the air.

David Graves, general manager of WIND in Chicago, designed "Electronic Producer" for use on an Apple II Plus. The program facilitates communication between a talk show's host and producer. The host has a monitor tied into the Apple and messages can be conveyed to him by the producer. A display of how long each caller has been kept waiting and what he or she is calling about is also maintained by the computer.

If someone calls with a "dynamite comment," the producer can put a flashing cursor by the call. Other messages needing to go on the air immediately can also be sent to the host's monitor.

In Phoenix, KKLT-FM disk jockey Timothy Greer wrote "Talkscreen" to run on a Commodore VIC 20. Like Electronic Producer, the host has a monitor tied to the computer. The producer prioritizes calls and gives the host 22-character messages about waiting callers.

Bob Dunn, producer of several talk shows on the AM side of KKLT, told *Infoworld* Talkscreen was not unfair and was designed to get the most information on the air for listeners.

E-paper publishers not in it for the money—yet

"If you're out to make a quick buck, the alpha-numeric presentation of news on cable television is not necessarily the way to do it."

That's the opinion of Roger Galstad, sales manager for *Telecable*, the electronic publishing subsidiary of the *Leader Telegram* of Eau Claire, WI.

According to the newspaper trade journal *Editor & Publisher*, Galstad, speaking at a cable marketing seminar held in Port Chester, NY, observed, "Television commercials retailers understand, alpha-numeric, static advertising they do not."

Telecable is available to 70 percent of the Eau Claire market via cable tv. Galstad said the service lost money its first year—when it produced $90,000 in revenues—and is expected to lose money this year even though the company projects the service will earn $200,000 in 1982.

To boost income, *Telecable* has introduced a five-minute, live-anchored newscast and sells traditional 30-second spots for it. In a short time, Galstad said, the program has become the service's most saleable product.

Micros alter lives of pupils and teachers

The teacher-pupil hierarchy is being shaken by increasing use of computers in the classroom, according to *The New York Times*.

Schools having experimented with computers report that they can dramatically alter an institution's social climate, the *Times* said. However, many teachers, contrary to their expectations, found computers promote conversation and cooperation among students rather than isolation and introspection, especially if the machines are placed in clusters.

Patricia Mattingly, the head of the Lamplighter School in Dallas, told the newspaper computers have had a democratizing effect on classes: "No one is best at computers in the way that someone is often best at mathematics."

A widespread phenomenon in schools that use computers extensively is that students' knowledge of the machines soon outstrips the teacher's, the *Times* reported. This alters classroom relationships in a way that many teachers view as positive. "I work with third graders," one Lamplighter teacher said, "and most of them are already beyond me. I think it's nice at that age to tell an adult something and be right."

Lewis Stewart, a 14-year-old ninth grader at Joan of Arc Junior High School in Manhattan, would agree with that assessment, the *Times* opined. Stewart is said to be a year and a half below grade level in reading, but when it comes to computers, he is at the head of his class. He recently designed a complex electronic football game that involved 75 subprograms, and he finds faculty members often calling on him for help with computer problems.

But some experts fear there may be some negative spinoffs from computers in the classroom.

James Hoburg, a professor of electrical engineering at Carnegie-Mellon University in Pittsburgh, said computers create a danger of "reinforcing people who want quick, superficial answers."

Schools may start overemphasizing problems and ideas lending themselves to quantification, the *Times* noted. It was told by MIT professor Joseph Weizenbaum, "The danger is that we will end up thinking like a computer and that the only legitimate problems are those where quantification and calculation play a big role."

He added: "Abrahem Maslow once said that to him who has only a hammer, the whole world looks like a nail. To him who has only a computer, the world looks like a computable domain."

Will Das Kapital become Die Auskunft?

For those who think computers may be the great social equalizer of the 20th century, think again, warned an artificial intelligence expert at the Massachusetts Institute of Technology in Boston.

In an interview published in the computer industry newspaper *Infoworld*, professor Joseph Weizenbaum said he saw future society splitting into information haves and have nots:

"My own feeling is that what is likely to happen is that there will be a partitioning of the population into fundamentally two classes: those who have access to computer-mediated activities in our society—banking, electronic mail and all that—and who think of that as a natural part of life. . . and those who don't. . ."

continued

Peripherals Unlimited...

FANTASTIC PRICES!

OUR FAST SERVICE, PRODUCT SELECTION AND OUR CUSTOMERS' SATISFACTION MAKE US #1.

ZENITH

Z-89-48K	$2299
Z-90-64K DO	$2588
Z-19 Terminal	$777
Z-121 Monitor 12"	$149

ATARI COMPUTERS

Atari 800 16K	$669
Atari 400	$318
Atari Interface Module	$174
Atari 810 Single Disk	$444
Atari 815 Dual Disk	TBA
Atari 830 Modem	$166
Programmer	$59
Entertainer	$84
Star Raiders	$34
16K Mem. Exp. for Atari	$74
32K Mem. Exp. for Atari	$114

NEC PRINTERS

7710/30 Spinwriter R/O	$2279
7720 Spinwriter KSR	$2649
3510/30 Spinwriter R/O	$1699
3500 Serial Spinwriter	$1599

NEC DOT MATRIX

PC-8023	$474

Call for prices on ribbons, etc.

MORE PRINTERS

Anadex 9500/9501	$1295
Anadex DP-9000	$1049
Okidata Microline 80A	CALL
Okidata Microline 82A	CALL
Okidata Microline 83A	CALL
Tractor (OKI 80 + 82 only)	$60
Diablo 630	$2044

MONITORS

Sanyo 12" GRN Phosphor	$266
Sanyo 12" Black + White	$239
Amdek 12" 300 GRN Phosphor	$149
Amdek 12" Color	$319
NEC 12" GRN Phosphor	$164
NEC 12" Color	$344

EPSON PRINTERS

MX-70	CALL
MX-80 w/Graphics	CALL
MX-80 FT (Friction + Tractor)	CALL
MX-100 (15" Carriage)	CALL

Call for prices on Ribbons, Cables and Interfaces

NEC-PC 8000 Series Microcomputer

PC-8001A Computer w/32K	$888
PC-8012A w/32K + Exp. Slots	$588
PC-8031A Dual Mini Disk	$888
PC-8032A Add-on Mini Disk	$777

Call for Software Prices

FOR THE LOWEST PRICE CALL

TOLL FREE

1-800-343-4114

ORDERING INFORMATION

Our order lines are open 9AM to 6PM EST Monday thru Friday. Phone orders are welcome; same day shipment on orders placed before 10AM. Free use of Mastercard and VISA. Personal checks require 2 weeks clearance. Manufacturer's warranty included on all equipment. Prices subject to revision. C.O.D.'s accepted.

For service, quality and delivery call:

PERIPHERALS UNLIMITED
(617) 655-7400
62 N. Main St. • Natick, MA 01760

272

See List of Advertisers on page 338

PULSE TRAIN *continued*

The author of *Computer Power and Human Reason* added, "The division will be pretty much along class and race lines. As usual the poor will get poorer (in the sense of being information literacy-poor), and the well-off will continue to be well-off and continue to receive the tools that make it possible to be well-off."

Weizenbaum went on to say his most serious concern is that the two classes will diverge from each other sharply and be unable to communicate with one another, making the separation unbridgeable.

In video games, the myth's the thing

Why can teenagers with a miniscule attention span in school spend hours in front of a video game? According to a California psychologist, it's because society fails to provide youths with the mythic challenges they need.

David Van Nuys, who has worked as a consultant for Atari and is a member of the psychology department at Sonoma State University in Rohnert Park, CA, was quoted in the computer industry newspaper *Infoworld* as observing:

"Teenagers sit in school for years and years and they hunger for life-and-death kinds of challenges. There's a myth involved in playing an arcade game. It provides a framework that allows people to act out or role-play being a hero, and I think that's more important than the aggressive component" of the games.

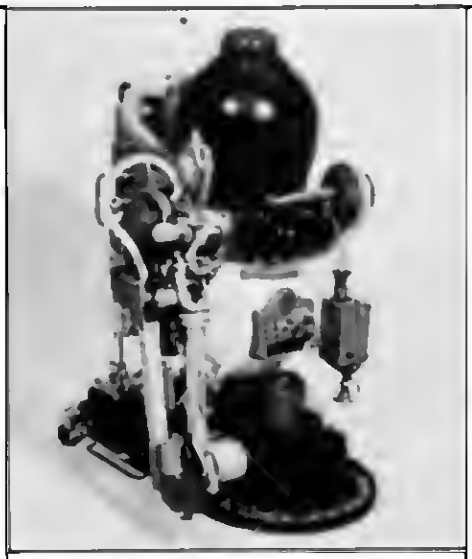
He added another reason the kids are attracted to the games is they're interactive: "They give you immediate response. For that reason alone they are a step up and out of the dark cave of television into the light of day. Instead of having a kid lost in a mind swamp of total passivity watching tv for hours on end, the kid is interacting with an environment that is pushing his horizons."

Will personal robot be next?

Now that the personal computer is here, can the personal robot be far behind?

That's a question posed in a report appearing in *The Wall Street Journal*.

According to that business daily, experts agree personal computers have paved the way for robots, but disagree on how soon droids will become consumer items. One consultant said robots today are where micros were seven years ago, while other experts contend widespread use of robots is 10 to 15 years away. James S. Albus, head of robotics research for the National Bureau of Standards, maintained household robots will be impractical until the 1990s, when they might be available for the price of a car.



Avatar: Will fetch someday.

Seven small companies are selling computer-controlled arms, bodies or complete robots ranging in price from $695 to $2,500. And Zenith's Heath Co., the nation's largest maker of electronics kits, plans to market a build-it-yourself robot—along the lines of Star Wars' R2D2—within two years.

The *Journal* report named several hobbyists who have created robots:

- Los Angeles engineer Glenn Hoffstetter who built "Ambuletron" for $400. It doesn't do much, he said, just roams around frightening secretaries.
- Dayton, OH, electronics and computer specialist Charles Balmer, Jr., who spent $2,000 on "Avatar." When Balmer finishes writing the programs for his robot, it will be able to keep its batteries charged and fetch Balmer's tools and slippers.
- H.R. Everett of Monterey, CA, spent $6,000 on Robart, which acts as a 5-foot, 4-inch electronic sentry for his home.

At present, though, robot sales are a marginal business, the *Journal* reported, yet robot builders persist. Jerome Hamlin, a former Yale University philosophy student and theatrical prop builder, constructed a robot butler, Comro. Featured in Neiman-Marcus's Christmas catalog, Hamlin sold three Comros at $15,000 each. Now he plans to introduce a "cute," computer-controlled assemble-it-yourself android selling for less than $2,000.

Hamlin's "cute" robot may be a sign of things to come. Observed Dallas consultant Portia Isaacson: "Take your cutest, most cuddly stuffed dog. Put wheels on its paws. Add sensors for noise and motion. Install an electronic chip that will bark, a computer that can recognize an owner's voice, and a motor to wag the tail. It would be great. You also wouldn't have to feed or housebreak it."

Bar codes for runners

They're on everything from groceries to magazines and now they're even on runners.

They're the ubiquitous bar codes and in runs like the Boston Marathon, Bonne Bell Race and Gasparilla Long Distance Classic, they're used to keep track of runners' times.

Since 1980, Honeywell Inc. has been the official timekeeper at those races and it uses bar codes—like the one on the cover of *80 Micro*—to keep tabs on runners. The bar codes are attached to the runners' numbers. After a runner finishes the race, the bar codes are collected, fed into a computer and within 20 minutes, race results begin to roll out of the machine.

Not only does the computer accurately peg a runner's time, but it can be programmed to break out a race into team scores, age divisions and different groups.

Tom Cusson, manager of Honeywell's technical support and computer operations, explained to the *Boston Globe*: "We know at the moment it happened who finished 12th in the women's over-40 group."

The Honeywell computer also provides each runner with a permanent record of his or her performance. A postcard is produced by the machine and mailed out by Honeywell 24 hours after a race. For a Jane Doe finishing the Boston Marathon, the postcard may look something like this:

Congratulations, Jane, on finishing the Boston Marathon. Your finishing time was 3 hours 14 minutes and 22 seconds. Your overall rank among women was 198 out of 865. Your age is under 40. The average finish time for your group was 3 hours 19 minutes and 11 seconds. Your rank within the group was 87 out of 696.

In the Boston race, Cusson told the *Globe*, postcards will be sent to some 7600 racers. Information on the marathon, he added, is still being mailed to runners three months after the finish.

EDUCATIONAL SOFTWARE

For TRS-80* Color Computer, PET, Apple II.

ELEMENTARY	MATH
SCIENCE	HISTORY
GEOGRAPHY	ACCOUNTING
ECONOMICS	BUSINESS ED.
FOREIGN LANG.	FARM RECORDS
GRAMMAR	COIN INVENTORY

Write for FREE Catalogue

MICRO LEARNINGWARE ✓209

BOX 2134, N. MANKATO MN 56001
507-625-2205

VISA & MASTER CHARGE ACCEPTED

We pay 15% royalty for Educational Programs listed with us

Apple is a trademark of Apple Computer Co.
TRS-80 is a registered trademark of TANDY CORP.
Pet is a trademark of Commodore Bus. Machines

CALL FREE FOR VERBATIM FLEXIBLE DISKS!

Toll-free 1-800-835-1129

Exceptional prices, quick delivery
Visa/Master Card/Checks/COD
Ask about our other TRS accessory and equipment buys

DATA SERVICES, INC.

DATA SERVICES INC. ✓118
Computer services since 1970
P.O. Box 1157 Wichita, Kansas 67201-1157
(In Kansas call 1-316-838-9021)

☆☆ SUPER™ ☆☆ ISA's DATABASE

The only DBMS with all these features

- ★ PROVEN in one year of test marketing
- ★ TOUGH, reliable file structure
- ★ MENU driven for simplicity and easy use
- ★ ARITHMETIC with stored calculations
- ★ FAST set-up and report formating
- ★ CLEAR user-oriented documentation
- ★ PRINTS totals & subtotals – mail labels
- ★ REFORMATS and merges data files
- ★ MULTI-DISK files. Up to 128K records
- ★ SORTS full disks on up to 40 fields
- ★ PRODUCTION input of repetitive data
- ★ COUPLES to word processor & statistics
- ★ POSTS transactions to master file
- ★ SEARCH by strings, ranges, comparisons
- ★ DATA COMPRESSION: Over twice as many labels as the other system

For TRS-80* Models I, II, & III – 250.00

Ask your Dealer or Write

Institute for Scientific Analysis, Inc.
P.O. Box 7186, Dept. M-1
Wilmington, DE 19803 (215) 358-3735

*TM Tandy Corp.

✓351

FILE FORCE

A Disk File Program Designed for the Small Businessman

SOFTWAREHOUSE INTERNATIONAL

Verbatim® Diskettes

Top-quality Verbatim® Diskettes from **Tech•Data**, your complete word and data processing supply center. Dealer inquiries invited.

Call Toll Free
1-800-237-8931.
In Florida, call
813-577-2794.

Tech•Data Corporation
3251 Tech Drive North
St. Petersburg, FL 33702 ✓440

™TRS80 color

From the January 1981 issue of the CSRA Computer Club newsletter

There was some amusement at the November meeting when the Radio Shack representatives stated that the software in the ROM cartridges could not be copied. This month's 68 Micro Journal reported they had disassembled the programs on ROM by covering some of the connector pins with tape. They promise details next month. Never tell a hobbyist something can't be done! This magazine seems to be the only source so far of technical informations on the TRS-80 color computer™. Devoted to SS-50 6800 and 6809 machines up to now. 68 Micro Journal plans to include the TRS-80 6809 unit in future issues.

To get the MOST from your 6809 CPU - This is the BEST SOURCE! The ONLY Magazine for the 6809 Computer. Months Ahead of All Others!

68 MICRO JOURNAL
5900 Cassandre Smith Rd
Hixson, TN 37343
USA

1 Yr. $24.50 2 Yr. $42.90 3 Yr. $59.50
*Foreign Surface Add $12.75 /Yr. to USA Price
Foreign Air Mail Add $35./Yr. to USA Price
Canada & Mexico Add $8.50 /Yr. to USA Price ✓213

DISCOUNT COMPUTERS

100% RS Components • No Foreign Drives or Memory
FULL WARRANTY

16K MOD III	$ 815	LINE PRINTER VI	$ 975
48K MOD III 2 Dr. RS232	$1889	LINE PRINTER VII	$ 299
64K MOD II 1 Dr	$2920	LINE PRINTER VIII	$ 599
128K MOD 16 2 Dr	$4930	DAISY WHEEL II	$1599
VERBATIM 5¼ Datalife	$ 210 per 100	MEMOREX 8" Dbl. Density	$ 270 per 100
VERBATIM 5¼ Plastic Box	$ 220 per 100	ALL RS SOFTWARE	20% Off

ALL OTHER ITEMS CARRY SIMILAR PRICING. CALL FOR PRICES.
Cashiers Check or Money Order must accompany all orders.
Shipped Freight Collect

(214) 271-2955 ✓232

NOCONA ELECTRONICS DLR#F-731 BOX 2063 GARLAND, TX 75041

✓See List of Advertisers on page 338

FEEDBACK LOOP

by Terry Kepner

"I've noticed a lot of low-price printers coming into this country from Japan."

Send any questions or problems dealing with any area of TRS-80 microcomputers to Feedback Loop, 80 Micro, 80 Pine Street, Peterborough, NH 03458.

Wow! Has the price of printers come down! I've noticed a lot of low-price printers coming into this country from Japan. Are they any good?

M.P.
Del Mar, CA

Yes they are. It is unfortunate that American printer companies are having a difficult time competing with the Japanese. In fact, Radio Shack's Daisy Wheel II printer is built in Japan because Tandy could not find an American company that could make a daisy-wheel printer to match Radio Shack's specifications of durability and speed.

I bought a book that explains how to generate sound using my TRS-80. The author suggested purchesing a small amplifier/speaker from Radio Shack. I did but all I hear is a hum. Is something wrong with my computer?

M.M.
Newark, NJ

Not if you can still CSAVE and CLOAD tapes. If you can CSAVE and CLOAD tapes normally, but cannot get sound out of the Radio Shack unit, then your problem could be with the amplifier/speaker, with the routines you use to generate sound, or with the way you have the unit connected to your computer. To test the amplifier/speaker, insert the gray plug that normally goes to the auxiliary jack of your tape recorder into the amplifier/speaker instead. Then, turning both the computer and the amplifier/speaker on, type CSAVE"A" and press Enter. You should hear the computer's 256-byte synchronization signal coming from the speaker. This is normally recorded on the tape to allow time for the tape recorder motor to come up to speed.

If you do not hear this signal, I would suspect the amplifier/speaker is defective. If you do hear the signal, the unit is okay. Double check your sound code.

Alternately, connect your computer to your tape recorder as if you were going to save a program, except unplug the small gray plug from the remote jack. Press the play and record buttons on the tape recorder and begin using your sound-generating routines. If the routines work correctly, you will get a tape recording of their output. When you're finished, stop the tape, rewind it, unplug the earphone plug and play the tape. If you hear only static or a hum, the problem lies with the sound-generating routines you are using.

Both tests assume the cassette port of the computer, the cables and the tape recorder all function correctly. If you cannot get your computer to save or load cassette tapes, check the cable first. Borrow a friend's cable and tape recorder and see if you can save or load a tape. If you still have problems, take the computer to a repair center and have their technicians take a look at it.

I did it now. Somehow I wrote over my TRSDOS disk. Any advice?

S.K.
Jackson, MS

This is not a complete tragedy. Radio Shack sells TRSDOS disks with the full operating system for $16.95. Drop by the nearest store and buy two. As soon as you get home, put one in a safe place and make a back-up of the other disk.

Here's a suggestion for you: Whenever you buy a box of blank disks, immediately back up your DOS onto each new disk. Not only does this find bad disks, if any, it also means you will always have a formatted and ready-to-use disk on hand. It will also prevent you from destroying the only working copy of your DOS.

I recently started to receive the Radio Shack newsletter and I would like to get back copies of it. I have written to Radio Shack with no success. Do any of your readers have back issues for sale?

L.O.
Allentown, PA

You're in luck. Radio Shack has just released a compilation of the first 20 issues (December 1977 to December 1980). Its catalog number is 26-2115 and it retails for $4.95. If you want copies of more recent issues, ask your Radio Shack Computer Center; many have back issues.

I just started to use the POKE and PEEK functions on my TRS-80. Is there a map available to help me find correct ROM addresses? I am especially interested in video display addresses.

M.K.
Jacksonville, FL

Pathways Through the ROM, sold by Softside Publications, 6 South Street, Milford, NH 03055 ($19.95), has a map of the Level II ROM and Basic RAM locations. The map was originally published as *Roger Fuller's ROM Map*.

Video memory begins at memory location 15360 (3C00 H) and runs through the next 1023 locations to 16383 (3FFF H). If you want to make your own map, with the video locations all marked off, get the video graphics display map in your TRS-80 Basic handbook and label the very first location in the upper left corner as position 15360. Label the first position of the line below it 15424. Add 64 each time you go to a new line until all 16 lines are labelled.

I know microcomputers are expensive, but recently I saw a book of several long business programs to key in selling for over $30. This was a peperbeck. With any other title it would sell for $10. What is happening to the personal computer business?

S.F.
Richmond, VA

There are several reasons why the book costs so much. One is the expense in developing these programs. Since the publisher anticipates limited sales because of the narrow market of buyers, he has to ask a higher price for it than for a more popular book (the more books you print and sell, the cheaper it costs to print each book).

MICRO MAINFRAME
OUT IN FRONT AGAIN WITH:

5 MEGABYTE HARD DISK KIT $1995.00

The M5-4FK is a complete hard disk subsystem kit for your TRS-80* computer. Install the kit in your own case and you are up and running. Kit comes complete with switching power supply, hard drive, controller, host adapter, connecting cables, operating system drivers for Doc-Plus 3.0 and easy-to-follow instructions.

STREAMER TAPE BACKUP SYSTEM FOR HARD DISK SUBSYSTEMS $1995.00

The MST-10 is a complete streamer tape backup system for any SASI* Plus hard disk subsystem. The MST-10 features read after write circuitry and error correction for data integrity. Because of the innovative design, the MST-10 will backup a 5 megabyte disk in only three minutes, or 10 megabytes in six minutes using standard DC-300XL data cartridges. The MST-10 is the answer for hard disk backup.

SASI-Net* MULTIPLEXER: $795.00

The SASI-Net* multiplexer will allow multiple similar or dissimilar computers to share a common hard disk subsystem. With this device, four micro computers can share a common hard disk, forming a "Mainframe" like network. Additional SASI-Nets* can be cascaded onto the system, allowing virtually unlimited growth.

M-50FM HARD DISK SUBSYSTEM $3195.00

The M-50FM subsystem is a factory assembled and ready to run hard disk subsystem for your micro computer. The M-50FM features an ERROR CORRECTION controller and our SASI-Net* multiplexer installed within the enclosure. The unit comes complete with power supply, case, SASI-Net*, hard disk, host adapter, controller and operating system drivers for DOS-Plus 3.0D.

120 MBYTE HARD DISK SUBSYSTEM $10,500.00

The M-120FM hard disk subsystem is the largest Winchester hard disk subsystem available today for micro computers. It features 120 Mbytes of formatted storage, ERROR CORRECTION controller and alternate sector mapping. The SASI-Net* multiplexer is also included to allow multiple computers to share the M-120FM storage, forming a "Mainframe" like network.

FDC-3B FLOPPY DISK CONTROLLER $139.95

The FDC-3B is a completely factory assembled and tested floppy disk controller for the TRS-80* model III. Gold plated card edge connectors and digital data separation insures reliable operation. The FDC-3B is the budget minded answer for floppy disk upgrade.

FDC-3C FLOPPY DISK CONTROLLER $199.95

The FDC-3C is the premier floppy disk controller for the TRS-80* model III. Advanced technology and engineering allows the FDC-3C to read and write both 5¼" and 8" drives. A special proprietary digital data separator with temperature compensation and gold plated card edge connectors insures reliability. Completely factory assembled and tested, the FDC-3C is the finest floppy disk upgrade controller available today.

MICRO MAINFRAME

Call for the location of your nearest Micro Mainframe dealer

Dealers please inquire on your letterhead

MICRO MAINFRAME

2227 McGregor Ave. · Rancho Cordova, CA 95670 · (916) 635-3997

*TRS-80 is a Tandy trademark
*SASI-Net is a Micro Mainframe trademark
*DOS-Plus is a Micro Software Systems trademark

Another reason is the scarcity of books on the subject. Unfortunately for the consumer, the personal computer market is a seller's market. The book is selling for $30 because the publisher knows people are going to buy it. Until the market is as large and competitive as the mass media market, you'll be seeing lots of overpriced computer books. (Actually, there are responsible publishers who do not take advantage of the current market position and sell their books for reasonable prices. I just wish that there were more of them.)

My friend and I both feel we have become expert programmers. We experts, however, have a difference of opinion. He claims the POKE statement draws illustrations fastest without going into machine language. I say the CHR$ statement is the fastest. Who's right?

M.A.
Baton Rouge, LA

The experts are wrong again! The fastest way to draw graphics is to put them into Print statements, or variables, and then print them. For example:

```
A$ = CHR$(129) + CHR$(130) + CHR$(131)
   + CHR$(161) + CHR$(184):PRINTA$
```

will put graphics on the screen faster than five POKE statements, or one Print statement with five CHR$(x)s in it. In the last two cases the Basic interpreter has to process each graphics block separately as it goes to the video. In the first case, all the work is finished before it goes to the video.

I own a small business and am considering using a microcomputer to do my accounting. Not knowing much about microcomputers, I was wondering if I have to purchase an existing accounting software package, or is it easy to develop my own program?

J.C.
Newport News, VA

Programming a computer is like writing a letter in a foreign language; if you know what you're doing, it's easy and fairly quick. If you don't know what you're doing, be prepared to take a long time and to make many mistakes before it's finished.

Since you say you don't know much about computers I have to conclude you also don't know very much about programming. Learning how to program takes months of steady work, quite similar to learning a foreign language. You not only have to memorize the vocabulary, you must also learn how to correctly use words in groups. Programming is learning the correct way to get the computer to do the things you want; there is no quick and easy way to bypass this learning procedure.

As a rule of thumb, any program worth writing will take a minimum of a month of solid work, not including the time required to write the documentation. If you're in no hurry to use your computer for your business, you can learn to program and then write programs for your needs. Otherwise I'd suggest you buy the programs you want to use in your business.

I am thinking about creating software for my business and then selling the package to others in the same business. I would hate to spend the time developing a program just to have someone else copy and resell it. Is there any protection for the microcomputer programmer?

C.P.
Stockton, CA

Welcome to the gray and mysterious land of copyright protection. Supposedly there is protection for the computer programmer, but getting it is likely to cost a lot of money in lawyer's fees. According to the copyright laws, if someone copies and sells your program without your permission, you have the right to seek monetary compensation. However, proving the program the pirate is selling is actually your work and not a genuine creative effort of the pirate is not easy, especially if the pirate has added enhancements to your program. This involves courts and lawyers and can get expensive.

Most companies rely upon the threat of court action, which usually works, to prevent people from stealing programs.

If you have the bad fortune to run into someone who doesn't believe you'll take him to court, or who isn't afraid of fighting you in court, then you're stuck. He'll continue to copy and sell your program until the court does something about it, which will cost both of you a lot of money. The pirate can still profit because he didn't have to pay for the cost of developing the program, paying royalties and supplying customer support.

The best way to prevent someone from taking your program is to make it too difficult for them to copy. There are two ways to do this: Make the program uncopyable either by using a non-standard format, or encode the program; or make the program very dependent upon the documentation, and make the documentation thick.

The problem with the first method, selling uncopyable programs, is that you antagonize customers wanting to make legitimate backup copies for their files. Besides, anything stored on tape or disk can be copied by an expert programmer. So this method will deter only the amateur from copying your program.

The second method is a bit better, but costs more money. For example, no one in their right mind would want a bootleg copy of LDOS. You have to have the documentation to use it. Since the documentation is hundreds of pages thick, copying it is no small problem. It would be cheaper to buy a legitimate copy than spend hours and dollars photocopying the documentation. From the producer's point of view, creating this volume of documentation is time-consuming and expensive. Copyright laws are clearer on the written word than they are on magnetically stored programs.

Many companies either price their products high enough to cover the revenues lost from bootleggers, or they price their products low enough to discourage the bootleggers from trying to make a profit.

I have tried, without a great deal of success, to find out from Radio Shack the effect of adding a lowercase kit to my Model I Level II. If I were to add a lowercase kit, what effect will it have on the keyboard (will lowercase characters be generated unless Shift is depressed?), video (will lowercase and uppercase be generated and displayed?), programs (what effect will it have on all those programs I have already typed in and will they run?).

If the lowercase kit is installed, but the driver program is not loaded, what happens?

R.H.
Berthoud, CO

Some background information is necessary before I can answer your questions. The TRS-80 Model I was originally designed as a hobby machine, and as a result lowercase capability was left out. Since they had no intention of adding lowercase, the designers of the computer decided to save money. Displaying uppercase letters, special characters and graphics characters does not require a full eight bits of memory for each video location. They saved $1.49 by making the video use only seven bits.

This means bit 6 of the video memory does not exist as a location. Everything sent to the video has bit 6 set. So when you send an "A" to the screen, what you're actually sending is a binary one (bit 6 is a binary 64 and is already set, permanently). The video display adds the 64 and 1 and gets 65, the ASCII code for an "A." If you send a lowercase "a," it is converted by the video display to an uppercase "A." By using only seven bits instead of eight when manipulating ASCII codes, the ROM

"I believe Super Utility or Super Utility Plus should be present at every serious TRS-80 disk installation."

(We didn't say this; Paul Wiener did in 80 Microcomputing, Jan. '81. . .*but we sure agree with him!*)

Get Yourself a "Super" Utility from the most powerful software vendor.

THE KING OF UTILITY

NOW AT SPECIAL PRICES:

Super Utility*

- Mod I, single density only
- 24K machine language
- Zap
- Purge
- Format
- Special format
- Format without erase
- Disk copy
- Special disk copy
- Tape copy
- Disk repair
- Memory utility
- Protected disk
- MORE

- $29.95
  (Reduced from $49.95)

*While they last!

Quick Fix*

- Mod I, single density only
- Zap
- Purge
- Format
- Format without erase
- Copy
- Disk repair
- Recover killed files
- Memory utility
- TRS DOS, New DOS + (2.1) only
- MORE

- $19.95
  (Reduced from $34.95)

*While they last!

SuperUtility Plus

You heard about it! You read about it (80 Microcomputing). Now get the "codilloc" at a special price! Compatible with Mod I, and Mod III, and all the current operating systems! Copy files from any DOS to any DOS, Mod I or III, without converting!

- Zap
- Purge
- Format
- Special Format
- Format without erase
- Disk copy
- Special disk copy
- Tape copy
- Disk repair
- Memory
- File Utility Configurable System
- MUCH MORE
- Mod I & Mod III on Same Disk

- $49.95
  (Reduced from $124.95)

Dealers! Place your orders now at this special price!

8/31/82 - LAST DAY ORDERS ACCEPTED AT THIS LOW PRICE - HURRY

POWERSOFT (tm)

11500 STEMMONS EXPRESSWAY, SUITE 125
DALLAS, TEXAS 75229
PHONE (214) 484-2976
MICRONET 70130,203

DEALER INQUIRIES INVITED

MasterCard VISA

Shipping is included in sales to Canada & U.S.

POWERSOFT IS A DIVISION OF BREEZE/QSD, INC.

FOREIGN ORDERS ADD $10

61

See List of Advertisers on page 338

routines were simplified, reducing development and hardware costs.

When the Radio Shack uppercase/lowercase kit is installed, the video character generator chip and the video memory chip are replaced. The new VCG contains the uppercase alphabet in the first 26 locations. The ROM routines sending the binary one to the video will still operate normally. It also contains the uppercase alphabet at positions 65–90 allowing the uppercase/lowercase driver to operate properly.

"They saved $1.49 by making the video screen use seven bits."

Now for your questions.

Keyboard—Unless you have the uppercase/lowercase driver in place and activated, the keyboard will operate as if there were no modification. Uppercase letters will be typed unless the shift key is depressed, in which case lowercase letters will be typed. As in the unmodified computer, the lowercase letters will be displayed as uppercase letters.

Video—Upper and lowercase letters will be displayed only if the uppercase/lowercase driver is in place and activated.

Programs—Most programs will operate normally, with or without the uppercase/lowercase driver activated. The only programs you will have trouble with are those that use the PEEK command to examine the video. These programs expect to see only valid ASCII numbers on the screen. With the uppercase/lowercase modification installed, these programs will see values in the range of 1–26 for the uppercase letters. The ASCII values in that range are control codes and will cause difficulties for the programs. For example, if you have uppercase/lowercase capability, which is not activated, and you have an uppercase "A" in video location 15360, typing PRINTPEEK(15360) will give you the ASCII value one. If your program has something like:

```
A = PEEK(15360):IF A = "A"THENSTOP
```

the Stop will not be executed because the ASCII value of "A" is 65, not one. Similarly, if you are PEEKing the video and sending the results to your line printer, you will have problems because the codes 1–26 are printer control codes.

The solution to these problems is rather simple; test the value PEEKed from the screen for illegalities. If you get a value below 27, add 64 to it and let the program continue.

Driver—The presence, or absence, of the driver will only affect whether the lowercase letters are displayed as lower or uppercase.

I have a long math program using about 20 variables. Every time I run the program I get the error message ?/0. I checked and rechecked the program and the formulas don't call for such a calculation. Is it my TRS-80 or me?

R.T.
Tacoma, WA

I'm sorry to say the problem is you and the program. If your program doesn't have any division in the formulas you're using, the problem lies with the size of the program. If a program tries to use up more room than is available, you should get an out-of-memory error. This can accidentally be circumvented if you're using any POKEs or machine-language routines, in which case the program is stomping on the variable storage area and causing the problem.

On the other hand, if none of the formulas contain values that are supposed to be at zero, then somewhere in your program a variable is being set to zero when it shouldn't. The only way to find such a problem is to put a Print statement after each program line that does a calculation, printing out the values just calculated. In this way you'll quickly find out where the problem lies. Also, be sure to check that the variable names you're using do not accidentally repeat. You may be using two variable names that the computer is treating as one. (This usually occurs only if you're using variable names longer than two letters.)

I'm working on a problem which calls for the calculation of numbers in the millions. The problem is that my TRS-80 returns results in exponential numbers. What can I do to resolve this problem? I am easily confused by exponential numbers.

A.S.
San Antonio, TX

Use the PRINTUSING command to build a display for you:

```
PRINTUSING "$$########,### ##";123456789.12
```

will display as:

```
$123,456,789.12
```

instead of

```
$1.23456E+08
```

Additionally, you'll have to define all your numbers as double precision, since single precision will only calculate and display the first seven significant digits of your number, the rest being lost from the calculations (an error in the hundreds).

I have an idea for a video newsletter. I own a TRS-80 and would like to have other TRS-80 owners access the newsletter by computer. Can this be done? How do I get started?

Y.K.
Tampa, FL

If you want to establish a bulletin board for subscribers to call, give a password and then be able to read the newsletter, you can most certainly do this. You'll need a dedicated phone line, a direct-connect modem that will let your computer answer the phone, an RS-232 board for your computer, a bulletin board program to selectively screen incoming calls and a computer with sufficient memory and disk-drive space to hold the program and newsletter.

Radio Shack sells the D.C. Modem II for $249 and the RS-232 for $99. There are several sources of BBS programs, including:

B.T. Enterprises (516-981-8568), Connection-80, which works with DOSPLUS, NEWDOS80, and LDOS;
Lance Micklus (802-864-5899) who has a set of three, the Personal Bulletin Board System (16K LII tape-based $80), ST-80CC ($149), and Mouse-Net ($349), all of which will work under TRSDOS, LDOS, NEWDOS80 or DOSPLUS;
Small Business Systems Group (617-692-3800), Forum-80 ($350), which requires NEWDOS80.

If you just want to send a newsletter to subscribers, that too is easily done. All you need are: an RS-232 board, a modem and a communications program. I don't think you'll want to do it this way because of the money you'll spend making the phone calls to all of your subscribers.

The other choice available is to store the newsletter on cassettes as a data file or newsletter program, a la *CLOAD* or *Chromasette* magazines, which you would periodically mail to your subscribers. The advantage to this last system is that your subscribers don't have to buy any extra equipment (RS-232, modem and communications program) to subscribe to your newsletter. ■

THE BOOKKEEPERS

FOR INFO CALL (603)-447-2745

Intermediate Bookkeeper—48K, 2 Drive & Printer.....$109.95
Ann Rose, our Accounts Receivable Clerk—
48K, 2 Drive & Printer.....$150.00
The Count—A variety of utilities such as weight, area and capacity conversions; loan amortization; hex code conversion, etc.
48K disk.....$49.95

All programs are for TRS-80TM Model I or III.

STURDIVANT & DUNN, INC. ✓180

BOX 277, 124 WASHINGTON ST., CONWAY, N.H. 03818

(TRS-80 is a trademark of the Tandy Corp)

PROFESSIONAL SOFTWARE **TRS-80® MODEL II & 18** NOW AVAILABLE!

BASIC COMPILER BY MICROSOFT • EASY TO USE **$339.00***
• TRSDOS® 2.0 COMPATIBLE • INCLUDES M-80 & CREF-80
• UP TO 30 TIMES FASTER • AUGMENTED WITH OUR DOCUMENTATION

DISK SORT • YOU DON'T HAVE TO BE A PROGRAMMER TO USE IT! **$69.99***
• MENU DRIVEN • RANDOM FILES • EASY TO USE • SPEC's SAVED ON DISK DOC. ONLY $10.00
• EASILY INSERTED INTO JOB STREAM FOR NON-STOP RUNNING • FULL DISK CAPACITY DEDUCTIBLE ON PURCHASES

BASIC CROSS REFERENCE • SAVE HOURS! **$59.99***
• SEE USED LINE#s/NAMES AT A GLANCE • PRODUCES NICE PROG. LISTING • INDISPENSABLE DOC. ONLY $10.00 DED. ON PURCH.

EPSON MX-80 $475.00 MX-100 $764.00 HURRY-LIMITED TIME!

PAPER 9½x11 18lb WHITE STRIPS TO 8½x11 3,000/BOX **$25.00***

MAILING LIST • HIGH CAPACITY • SPANS DISK • NO SORTING **$149.95***
• FAST RETRIEVAL-UPDATE • R/S CONVERSION INCLUDED • LONG/SHORT FORMATS DOC. ONLY $10.00
• ESTIMATED AVAILABILITY - MAY 15, 1982 DED. ON PURCH.

*PLUS POSTAGE & HANDLING. PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

TRS-80 & TRSDOS ARE REGISTERED TRADEMARKS OF TANDY CORP.

GOOD-LYDDON DATA SYSTEMS
5486 RIVERSIDE DR., CHINO, CA 91710 (714) 980-4563 ✓186

MASTER CARD or VISA accepted.

Fly Around the World!

(and develop a world of business!)

Expand your sales world-wide. Meet importers and manufacturers in Asia and Europe at a series of electronics/computer trade shows arranged for your convenience in Tokyo, Taipei, Hong Kong, Beijing, Canton, Seoul, and Munich. Join about 200 fellow businessmen in taking advantage of this world market for sales and buying. Despite the reasonable tour price it includes some fabulous meals and first class hotels.

Far East Electronics Tour
(Oct. 24–Nov. 7, 1982)

Optional Around-the-World Tour
Including Electronica '82 in Munich
(Nov. 9-13, 1982)

Call Edith collect for more information.
Tel.: (415) 433-3072; (415) 433-3408

Commerce Tours International
870 Market Street, Suite 742
San Francisco, CA 94102

SOFTWARE YOU CAN BET ON!

POOL 80

Here's the program that will automate your office pool for professional football. POOL80 will:

- Keep track of the schedule
- Print weekly entry forms
- Print selection summary for players game time use
- Tabulate results
- Maintain cumulative records

POOL80 requires only a few minutes each week for updating. Comes ready to go for the 1982 season. Can be used year after year. Diskette only

Only $20.00

DRAW5

This is the poker playing program that's getting the rave reviews.

After a while each of the simulated players takes on its own individual personality — it's most uncanny. DRAW5 has definitely sharpened my playing skills. (Lloyd Martin, *80 Microcomputing*, Jan. 1982)

"If you like playing poker, buy this program. It will be a long time before a better one comes along." (Richard Clope, *Computer Shopper*, Jan. 1982)

Five card draw. Gardena CA rules. It's you against six almost human opponents.

Only $15.00

SPREAD 80

The tops in professional football handicapping programs. This is another winner from Real World Simulations, the designers of DRAW5. SPREAD80 showed an average weekly profit of $18 per $100 bet for the 1978, 1979, 1980 and 1981 seasons.

If you bet football (and who doesn't) at the casino, with a bookie, or in the office pool, this is the program for you.

SPREAD80 comes on diskette ready for the 1982 season.

Only $25.00

DRAW5 supplied on 500 baud cassette. Add $4.00 for TRS-80 Model I or III diskette. All programs available on 8" disk for Model II at $6.00 additional. PA residents add 6% sales tax. North Star diskette versions of DRAW5 and SPREAD80 can be obtained from Real World Simulations, Box 4107, Torrance, CA 90510.

WILSON Software Division
539 Springhouse Lane • Camp Hill, PA 17011

TRS-80 is a Tandy Corporation trademark ✓192

THE DATA CONDITIONER

TREATS YOUR TAPES WITH STYLE

- Copies system and data tapes without computer
- Eliminates noise and minor dropouts
- Signal conditions while loading or saving
- Operates ALL TRS-80 baud rates
- Rugged construction
- AC powered

Exclusively from Communications Systems Laboratories

$69.95 (Post Paid)

CALL
(808) 677-3380

OR WRITE
Communications Systems Laboratories
84-185 Leahone St., Waipahu, HI 96797

✓361

write for info on our new COPY CONDITIONER - drive up to 10 tapedecks from source deck - $148.95

FINALLY

Your cassette based TRS-80* can handle data files!

RAMFILE is the answer. It will allow you to write BASIC programs that will efficiently store data in the Random Access Memory of your computer. You will be able to sort and selectively retrieve, update and delete the data and store it on tape for future use, at a speed and efficiency that you never thought possible. RAMFILE runs with 16K or larger Level II or Model III BASIC.

RAMFILE and demonstration BASIC program on cassette tape and manual. $59.95.
Postage paid in U.S.A. Foreign orders include $2.50. Ill. Residents include 5% sales tax.

Send orders to:

INDIVIDUAL SYSTEMS INC.
P.O. BOX 343
Downers Grove, Illinois 60515

*Trademark of Tandy Corp. ✓424

✓See List of Advertisers on page 338

80 LIST OF ADVERTISERS

RS Number		Page
173	ABS Suppliers	343
30	A.M. Electronics	397
343	ARM	37
107	Aardvark 80	386
28	Access Unlimited	232, 233
197	Ace Computer Products of Florida	87
380	Acorn Software Products	398
78	Acorn Software Products	58, 38
573	Advanced Systems Concepts	390
578	Adventure International	409
83	Aerocomp, Inc.	298, 247
571	Agricultural Software Consultants	398
75	Alcor Systems	123
138	Algorix Software	170
568	Algorix Software	398
178	All Systems Go	47
11	Alpha Byte Stores	CIII, 16, 19, 287
17	Alpha Products Company	23, 23, 25
112	Alphanetics	91
113	Alphanetics	91
501	Alphanetics	389
86	Alternate Source, The	184
217	American Small Business Computers	213
218	American Small Business Computers	215
219	American Small Business Computers	215
220	American Small Business Computers	217
221	American Small Business Computers	217
223	American Small Business Computers	217
223	American Small Business Computers	279
224	American Small Business Computers	299
423	Amflex Products & Services	54
284	Ancie Labs	88
40	Apparat, Inc	397
6	Arcsoft Publishing	377
398	Arrix Logic Systems Inc.	269
86	Aspen Software Company	371
538	Atlantic Cabinet Corp.	299
29	Automated Simulations	186
553	Avalon Hill Microcomputer Div.	398
566	Avalon Hill Microcomputer Div	392
300	B.T. Enterprises	71, 225
243	Bay Technical Assoc. Inc.	253
180	Bayesian Investment Service	226
153	BCDcompco	41
134	Beard Software Development Company	26
315	Bible Research Systems	64
30	Big Five Software	109
108	Binary Devices	126
*	Blechman Enterprises	279
309	Bottom Line, The	113
206	Bottom Line, The	343
181	CMD Micro	122
160	CPU Shop, The	266
565	CRB Microtools	398
415	CRB Microtools	353
139	C&S Electronics Mart	130
566	Charles Mann and Assoc.	398
569	Charles Mann and Assoc.	393
397	Cedar Software Company	399
102	Cload Magazine Inc.	57
103	Cload Magazine Inc.	57
121	Cognitec	83
301	Communications Systems Lab	337
253	CompuAdd Corp.	327
486	Compukit	351
547	CompuLink Corp.	399
559	CompuServe	398
236	CompuServe	26
398	Compusoft Publishing	81
389	Computer Accessories of Arizona	353
130	Computer Applications Unlimited	381
139	Computer Case Company	153
133	Computer Discount of America	280
507	Computer Generated Data	390
420	Computer Peripheral Resources	277
18	Computer Plus	27
186	Computer Shack	75, 77
653	Computer Shack	79, 81
38	Computer Shopper	287
329	Computer Software Design	183
548	Computerfats Directory	280, 353
386	Computerware	184
27	Compuvex	104, 105
86	Contract Services Associates	191
108	Coosol Inc.	227
308	Cornsoft Group	173
45	Cornucopia Software	85
200	Corsair Computer Company	343
38	Cosmopolitan Elect Corp.	317
187	Cottage Software	277
160	Creative Computer	226
266	Creative Software	78
506	D.B. Management Inc	398
568	D.B. Software	399

RS Number		Page
410	D.B. Software	178
517	DCS Software	263
400	D.L. Dawson	369
453	Data Mart	294
15	Data Resources	175
10	Data Resources	168
15	Data Resources	241
292	Data RX, Inc.	204
116	Data Services, Inc	253, 321, 543
436	Data Score	298
542	Dayster Technology	115
394	Decision Science Software Inc	354
566	Devoka Data Products	399
563	Dezoysa Enterprises	400
101	Discount Software Group	35
82	Displayed Video	154, 150
353	Dresselhaus Computer Products	100
268	Dubois & IncNamara	290
434	E Plan Ltd.	78
218	E.A.P. Company	343
271	EBG & Associates	200
49	ESI Lynx	309
*	Eduware	261
154	Eigen Systems	287
*	Eighty Micro	311, 309, 271, 363, 272
*	Eighty Micro Book Shelf	399
329	Eighty-Northwest Publishing	278
139	Electronic Specialists	353
344	Eltech Associates	353
572	Epson America Inc.	400
97	Epson America Inc.	210, 211
80	Exatron	Cover IV
428	Excalibur Software	315
*	Excelloria	208
553	Exide Electronics	266
399	F/S Associates Inc	74
30	Fantastic Software	119
454	Far West Systems & Software	78
287	Floppy Disk Services Inc.	257
214	Fort Worth Computers	301
412	Forthright Software	298
202	Frank Hogg Laboratory Inc.	231
14	Free Coupons	17
240	Freedom Technology International Inc.	401
66	Futuresoft	50
*	Futureview Inc.	171
425	GH Computer Systems Inc	279
553	George Associates	399
165	Good-Lyddon Systems	337
8	H&E Computronics, Inc.	193-201
574	H.F. Signalling	390
408	H.F. Signalling	298
186	H&H Trading Company	208
*	HPB Vector	227
*	H.W. Electronics	65
244	Hacks	100
426	Hairad Associates	298
208	Hayden Book Company	375
47	Heath/Zenith Company	111
48	Hexagon Systems	148
564	Holmes Engineering	398
153	Holmes Engineering	264
431	Hon Finance & Insurance Computers	298
373	Horizons Software	319
175	Howe Software	277
211	ICR Futuresoft	30
66	ICR Futuresoft	50
*	IJG	263
404	IJS	353
578	Ico-Rally Corp	398
568	Ico-Rally Corp	398
54	Icrom Enterprises Ltd	133
274	Illustrated Memory Banks	60
424	Individual Systems, Inc	74
486	Infosoft Computer Systems	91
128	Insiders Software Consultants	268
*	Instant Software Inc.	387
381	Institute for Sciemific Analysis	331
183	Interface, Inc.	298
430	Intergraphics Inc.	343
553	International Council for Computers in Education	400
501	International Micro Systems	400
413	Island Computer Services	208
203	JES Graphics	337
273	J.F. Consulting	10
43	JPC Products Company	273
354	Jimsoft Inc.	298
560	Joe Agrella	398
238	Joe Computer	257
594	Joe-King	390
150	Johnson Associates	146
321	KSoft	256
306	Kwik Software	353

RS Number		Page
30	LNW Research	7
31	LNW Research	166
33	LNW Research	381
33	LNW Research	60
53	Laredo Systems Inc.	325
701	Lawyers Microcomputer, The	73
130	Leds Publishing Co. Inc.	153
560	Lemons Tech Services	360
358	Lemons Tech Services	255
*	Level IV Products Inc.	229, 398
131	Libra Laboratories Inc.	279
135	Lindbergh Systems	192
*	Load 80	259, 384
452	LSi	107
115	Lynn Computer Services	225
427	MCSI	73
564	MK Enterprises	266
328	MSB Electronics	353
247	MTI	180, 181
168	Maine Software Library	122
557	Management Systems Software	276
570	Marathon Microsystems Inc.	390
411	Marathon Software	88
241	Mark Data Products	251
557	Mast Development Co	266
168	Master Electronics Inc.	253
407	Mayday Software	298
83	Med Systems Software	68, 97, 69
405	Media Tech	54, 364
250	Melbourne House	33
481	Memory Merchant	83
390	MESC	76
13	Mars Technologies Corp	9, 11, 13
146	Micro Architect	301
466	Micro Data Supplies	148
564	Micro-Design	400
453	Micro-Design	88
78	Micro-Design	313
77	Micro-Design	213
78	Micro-Design	313
132	Micro-80	183
161	Micro-Grip Ltd.	341
419	Micro Hatch	266
157	Micro-Images	53
111	Micro Investment Software	73
209	Micro Learningware	331
80	Micro Ininframe	333
68	Micro Management SyMems	151
183	Micro Mega	173
270	Micro Moonlighter Newsletter	164
560	Micro Pro Systems	402
422	Micro Quick	376
*	Micro Solutions, Inc	113
564	Micro Systems Software Inc	CII, 223
380	Micro Tech Exports Inc.	42
139	Micro Works	267
566	Microcon Digital Systems Inc.	400
117	Micromint Inc.	277
296	Microperipheral Corp	353
*	Microprogrammers, The	153
312	Microsette	142
282	Microsoft Consumer Products	130
137	Miller Microcomputer Services	178
133	Intisoitys	370
67	Mumford Micro Systems	231, 367
*	Nancy Modney	398
581	National Field Sales Inc.	360
128	Nelson Software Systems Inc.	88, 137
256	New Classics Software	64
232	Nocona Electronics	331
30	Omuron	28
195	Omnitek	133, 231
206	Options-80	327
273	Orange Micro	16
151	Orion Instruments	349
577	Orthocode Corp., The	400
29	PC Newsletter	287
433	PCD Systems	117
242	Personal Micro Computers, Inc	331
242	PMC Software	140, 331
252	P M W	353
207	Pacific Exchanges	35, 278, 337, 343
123	Pan American Electronics	566
333	Peggytronics	269
*	Percom Data Company	3
1	Percom Data Company	30, 31
2	Percom Data Company	30, 31
3	Percom Data Company	30, 31
406	Peripheral People	178
272	Peripherals Unlimited	329
124	Perry Oil & Gas Inc.	315
*	Phase I Systems Inc.	299
180	Pioneer Software	245
544	Platinum Software	319
377	Plug Bug, The	192

RS Number		Page
73	Plus Computer Technology	187
81	Powersoft	335
82	Precision Prototypes	51
560	Printronix Inc.	398
568	Pro-80 Systems	393
288	Process Control Tech.	180
80	Program Store, The	46, 48
248	Programmer's Institute	218
418	Programs for the 80's	256
143	Progressive Electronics	83
91	Prosoft	43
48	Quality Computer Services	347
164	Quant Systems	72
41	Racet Computes Ltd.	172, 237
389	Radix Tech.	226
264	Rainbow P&P Corp.	91
368	Rainbow P&P Corp.	32
460	Rainbow Software Services	93
298	Rainbow, The	186
130	Rand's Inc.	275
*	Reality Software Company	327
275	Red Baron Computer Products	177
114	Refware	279
145	Remarkable Software	200
129	Remsoft	144
541	Report Card	269
303	Richcraft Engineering Ltd.	343
438	Riverlake Systems	113
358	Rizon, Inc.	360
314	Robert J. Brady Company	67
476	Roco Software	298
569	Rogo Computer Products	400
437	SCF	281
38	SID	281
288	STSC Inc	243
143	Sales Data, Inc.	183
203	Scientific Engineering Lab	327
20	Scott Adams Inc., The Business Dat	191
510	Scott Tasso	279
12	Simutek	129, 131
578	Sixteen	402
213	Sixty Eight Micro Journal	331
*	Snappware	138, 141, 143, 145, 147
84	Soft Sector Marketing	159, 181
80	Soft Sector Marketing	183
86	Soft Sector Marketing	183
87	Soft Sector Marketing	187
88	Soft Sector Marketing	189
209	Softbyte Computing	389
379	Softcore Software Company, The	186
435	Softel	378
43	Software Concepts	83, 304
385	Software Galore	353
537	Software Options	209, 209
227	Software Support	121
306	Softwarehouse International	276
310	Softwarehouse International	321
118	Spectral Associates	305
575	Spectral Associates	402
545	Spectrum	269
208	Stanbuck Data Company	327
422	Star-Kits	78
398	Starware	269
180	Sturdivant & Dunn	337
71	Sublogic Communications Corp	308, 268
990	Summerville Enterprises	399
456	Suntock Systems	209
281	Swayback Software	389
*	Synergistic Solar Inc.	293, 266
174	Syracuse R&D Center	343
408	T&D Software	353
188	TAB Sales	298
70	Teranto & Associates Inc.	157
360	Tatum Labs	226
529	Tcorp	72
440	Tech Data Corp.	331
581	Terminal Brokers	388
59	Texas Computer Systems	343
450	Texas Digital	299
592	3M	398
61	Total Access	301
522	Two/Sixteen Magazine	272
*	University Microfilm	389
423	Universal Software	298
*	V R Data	393, 394, 398
180	Van Horn Office Supply	208
506	Veritas Technology Inc.	402
431	W C Maxey	378
*	Wayne Green Books	291, 305, 308, 307
178	Western Operations	70
212	William A. Fine	48
192	Wilson Software Division	327
158	XYZT Computer Dimensions Inc.	253
130	York 10 Computerware	549

For further information from our advertisers, please use the Reader Service card.

Notes from BENEATH the KEYBOARD

by Paul Wiener

Flash! There's a news bulletin at the end of this month's column. So if you're not interested in the bulk of the column, skip to the end for a quick micro-report on the results of the second North American Computer Othello Championship.

Now that the teaser's out of the way, let me apologize, in behalf of *80 Micro*, for the cutting room goblin's latest rampage. I hope you weren't too badly hampered by the transposition of text in May's column. Oh well . . .

Competitive Tree Searches

What do chess, reversi, checkers, and go programs all have in common? They all have a competitive tree searching algorithm. The nature of such algorithms has been treated in technical books and journals, but not too much has appeared in the popular press, so here goes Part I of Competitive Tree Searches.

I haven't made a formal study of the subject. Most of what I know was picked up in conversation with such leaders in the field as Charlie Heath, Bill Fink and Peter Frey. One book I did learn a lot from is the *Thinking Computer* (subtitled *Mind Under Matter*) by Raphael.

Several key concepts of the technique are listed below:

- Ply
- Evaluation algorithm
- Breadth-first search
- Depth-first search
- Minimax
- Alpha-beta pruning
- Presort
- Iterative search
- Killer Heuristic
- Windowing

Many of us are familiar with plies, the minimax algorithm and Alpha-beta pruning (or have at least heard of them), but the rest remains a fairly arcane field.

Since chess is a familiar game, I will use it for all my examples. As far as programmers are concerned, what chess players call a move really consists of two moves, one for white and one for black. Chess players sometimes refer to one player's move as a half-move. The term ply is used to eliminate this ambiguity. Ply refers to a single move by one player. A programmer's ply, then, equals a chess player's half move.

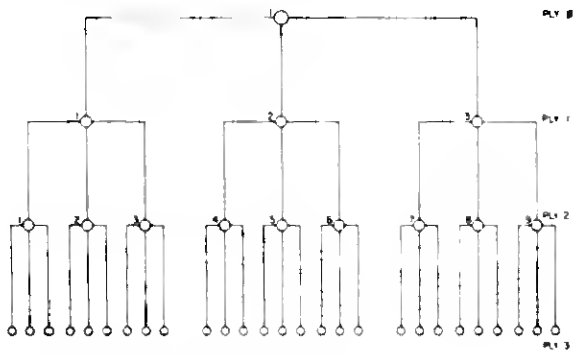


Fig. 1

Ply: The Tree's Seed

To some extent, a computer selects its move the same way a human selects his. It tries to look ahead as many moves as possible in an allotted time. A simple way of doing this requires the computer to generate the position resulting from each of its legal moves in the starting position, and to keep those new positions in memory. They are called successor positions. The computer then generetes all the successor positions to the successor positions, and so on, for the number of ply to be included in the search. In doing all this, the computer builds up a tree in memory. If a computer searches from a given position to a depth-of-three ply, and there are three legal moves at each ply, the tree would be structured like the one in Fig. 1.

Searching for a good move in this fashion is called a breadth-first search, because each ply, or level of the tree, is generated in full before going on to the next level. As you will see, a breadth-first technique is not a very suitable one for a chess-like application.

Each level of the tree represents a ply. Every circle is a node, representing a possible position that can occur in the game at that ply. The root, which is at the top, is the current position and requires no look-ahead to generate. That's why I've labeled it ply zero. Level one represents all the positions generated in the first ply. This is what the computer sees when it looks ahead one move. Assuming it's the computer's turn to move, it will also be the computer's turn in all even-numbered plies. Odd numbered plies are the opponent's turn to play.

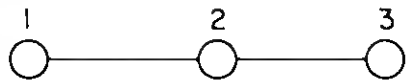


Fig. 2

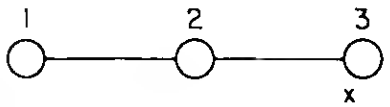


Fig. 3

The positions at the deepest ply of the tree are called terminal nodes. These represent the deepest level of look-ahead employed by the program. Hence, they are the key positions in the evaluation process.

When a program evaluates a position, it looks at a large number of terminal nodes resulting from different lines of play. A judgement must be made about the merits of each terminal position in order to choose the best line. This judgement, or evaluation, needs to be expressed as a numeric quantity which can be compared with the evaluations of other positions to determine which is best. A simple chess evaluation might be a piece count to see who's ahead in material. A more sophisticated evaluation would also take mobility and other positional considerations into account.

Notes from BENEATH the KEYBOARD

Obviously, the more comprehensive and well-designed the evaluation, the more accurately it will reflect a position's value. But a simpler evaluation might result in a stronger program. This is because of the time needed to complete a lengthy evaluation routine for every terminal position. As you can see from Fig. 1, the increase in nodes per ply is geometric.

Looking ahead only three ply with three options per position, the computer has 40 nodes to generate, 27 of which are terminal nodes in need of evaluation. Let's consider a more realistic chess situation. Suppose the computer is trying to look six ply ahead (that's only three chess moves, not very deep!), and there are an average of 25 legal moves per position in the tree. The number of terminal nodes would then be...Hmm, my word processor doesn't seem to have a number-crunching mode. I'll be right back, don't go away.

Hi there! Regards from Disk Basic. As I was saying, that would be 244,140,635. That's almost a quarter of a billion terminal nodes, but only three chess moves deep! So, in actual tournament competition, a quick and dirty evaluation often will prove superior to a smarter but slower one. A major part of the programmer's expertise consists of being able to choose an optimal trade-off between time and intelligence factors.

The tree's explosive growth rate also makes a breadth-first search too memory costly. The alternative is a depth-first search. When combined with alpha-beta pruning, a depth-first search not only requires a fraction of the memory, but also drastically reduces the number of terminal nodes evaluated. This frees up time for the CPU to look farther ahead, or to look just as deep but with a more elaborate terminal evaluation algorithm.

Wiener's Magic Cave

Let's play Adventure. I'll be your eyes, and you'll be my hands. We're in a room in a cave. Before us is a tree-like network of interconnecting tunnels. A sign on our left says "Egress Within Three Truths." We interpret this to mean we can reach the surface without having to make more than three correct turns. In other words, if only we knew the way, we wouldn't have to pass through more than three tunnel intersections.

An inventory of our possessions reveals that we have no map, but we do have a lit candle, a piece of chalk and a small chalkboard. We are determined to escape the cave, hopefully, before our candle burns down.

Here's a technique that would get us out—eventually. First use the chalk and board to draw a map. It won't be of the entire cave, or even of all the parts we explore. It will only show one stretch of tunnel with three intersections. It will, in fact, look like Fig. 2.

Start down the tunnel. Each time we come to a choice of directions, use the chalk to mark the passage we used to enter the intersection. That's the passage leading back to the precurser junction, and eventually to the starting point.

At each junction, take the leftmost turn available. Keep a tally of how many intersections we've passed through. When we reach the third intersection, take the leftmost branch as usual. Soon we reach another intersection, but are still in the cave and don't see daylight. Since we weren't supposed to have to make more than three correct choices, we know that somewhere we've taken a wrong turn. At any rate, the turn we made coming out of the last intersection definitely didn't lead us to light.

Node three on our map represents that last intersection. Make a little x on the map next to node three to indicate that the first way out is a failure. It should look like Fig. 3. Turn around and go back, until we're in junction three again.

Find the exit from this junction that has our chalk mark. This is where we originally came in from. Put our back to this exit so we'll be facing the same way we were on our first trip through. Now, consulting our map, a little x tells us that one path out of this junction has already been eliminated. This time we'll take the second leftmost tunnel out of the junction. If we eventually get to another junction without seeing daylight, we'll know we've blown it again, but at least we will have eliminated another false trail. Make a second x next to node three and back up again. This time we'll try the third leftmost exit out of junction three.

Suppose there are only three tunnels out of junction three (not counting the one we come in by). Also assume none of them lead to the egress. All three of them will now have proven useless to our quest. The next time we arrive in this junction, our map will have three x's, indicating the first three paths have been eliminated. But a glance shows us that there aren't any more exits from this crossing! What to do?

Now we know the leftmost path we've been taking out of junction two is wrong because it leads us to junction three, which has proven a total flop. So put another little x on the map, but this time next to node two. Then re-initialize node three by erasing all its x's.

Now back up to junction two, turn around, and get ready to leave it again. Our trusty map tells us not to take the leftmost choice, but the second leftmost. Doing so brings us to a section of the cave we've never seen before. When we reach the new third junction, a glance at our map's re-initialized node three reveals no

57	58	59	60	61	62	63	64
49	50	51	52	53	54	55	56
41	42	43	44	45	46	47	48
33	34	35	36	37	38	39	40
25	26	27	28	29	30	31	32
17	18	19	20	21	22	23	24
9	10	11	12	13	14	15	16
1	2	3	4	5	6	7	8

Fig. 4

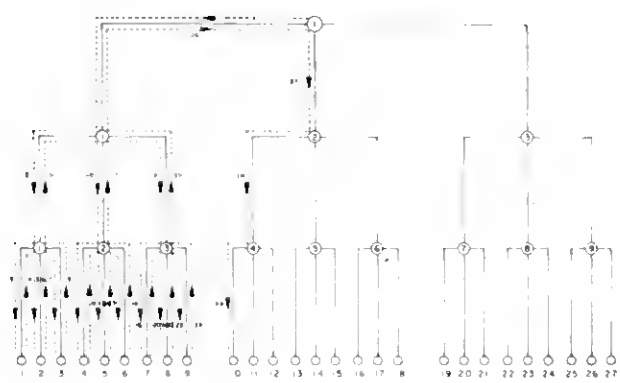


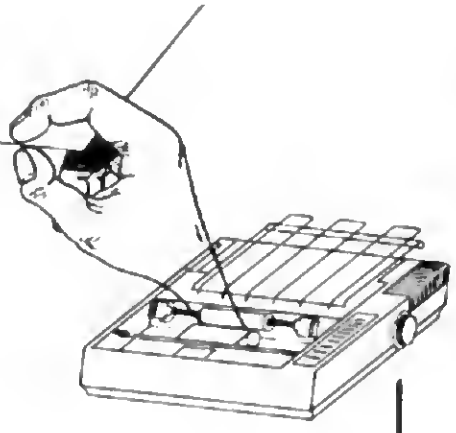
Fig. 5

Scanned by Ira Goldklang - www.trs-80.com

Micro-Grip™

We put the pinch on paper.

P.O. Box 4278, Norton Air Force Base, California 92409



INEXPENSIVE FRICTION FEED FOR THE MX-70 & MX-80

The MX-70 and MX-80 are two outstanding printers, however, they each have one major drawback; their inability to conveniently handle other than tractor feed forms. This shortcoming has been recognized by both us and the Epson Corporation. Their solution is to provide the MX-80FT, which provides both friction and tractor capability; ours is to retrofit the MX's already on the market. Their way can cost you over $100 for this capability if you buy it new, or quite a bit more if you have to sell your old MX printer which does not have friction feed, just so you can get one which does!

The MICRO-GRIP II is the answer Epson won't tell you about. For less that HALF the price of upgrading to the MX-80FT model, you can add reliable friction feed to your printer. Unlike most other friction feed adaptors on the market todey though, the MICRO-GRIP II is easy to install, rugged, and still allows you to use all your present tractor feed forms with your existing tractor feed mechanism. That's right; your existing tractor feed capability remains completely undisturbed! This is the best feature of the MICRO-GRIP II; you can still adjust your existing tractors down to within 3½ inches of each other (pin-to-pin measurement). One, two, three and four-up labels are no problem. Letterheads, cut sheets, roll paper, forms, checks, and even NCR forms are easy to use with the MICRO-GRIP II. You can print within 3/4 of an inch of the top of a cut sheet and all the way to the bottom.

Using existing mounting points and a screwdriver, the MICRO-GRIP II slides into place in about five minutes and locks tight! Yet if you must remove it for service or for any other reason, this too only takes a few moments. Your printer is not drilled or physically altered in anyway. Even your dust cover is undisturbed with the MICRO-GRIP II installed.

Why pay more??! For only $39.95 (plus shipping) you will receive the most remarkeble upgrade you can buy for your Epson MX-70 or MX-80; friction feed at 1/2 of the usually quoted price!

Order your MICRO-GRIP II friction feed conversion kit TODAY by sending only $39.95 (plus $1.50 shipping) directly to:

MICRO-GRIP, Ltd.
P.O. Box 4278
Norton Air Force Base, CA 92409

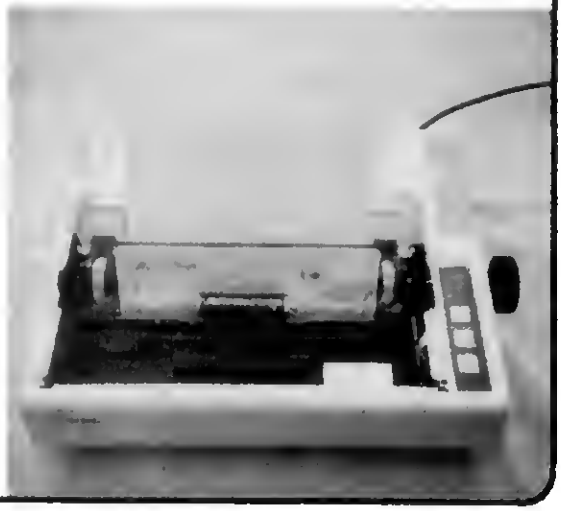
Phone (714) 884-6643

VISA & MASTER CARD Accepted

VISA MasterCard

15-Day Unconditional Money Back Guarantee

Quantity rates available upon request.



Notes from BENEATH the KEYBOARD

x's. This tells us to once again try the leftmost choice at this point.

And so it goes. After all the options have been eliminated at junction number two, we place an x near map node one and re-initialize node two. Then we back up to node one, our starting point.

One minor variation from our routine would occur if we were to encounter a dead end early in our search. Suppose that on our very first pass through the cave, we took the left most turn out of junction one and ran smack into a blank wall. All we'd have to do is put an x near node one on our map. This would ensure that we never pursued that fruitless first left turn again.

If there is truly an exit within our search range, this exhaustive method is guaranteed to find it. It might take a long time, but in a way, it's quite elegant. Regardless of how many zillions of tunnels were in need of exploration, we wouldn't need a big map or an exceptional memory to keep from going in circles. All we'd need would be a map with enough room for a little information about each level (or turn) generated.

In our case, we only needed room enough to draw three circles. We'd also need an unambiguous way of ordering our choices so that we could identify those branches as yet untried. In our chthonian exploit, the leftmost criterion provided a satisfactory method of ordering.

This may not come as a great surprise to you, but the procedure described above is analogous to a computer doing a three ply depth-first search. The computer has its own way of ordering legal moves. It might be an arbitrary method or a smart one. We'll consider the advantages of intelligent ordering in a little while. Let's first look at arbitrary ordering.

Ordered Move Generator

Start by numbering the squares from 1 to 64. See Fig. 4 for a numbered chess board. Once the square ordering has been established, start on square one. If square one is occupied by a piece belonging to the player whose turn it is to move, generate all the legal moves available to that piece. The move which would put the piece on the lowest numbered square is the first move. The move which puts it on the second is the second move, and so on.

When all the moves from square one have been catalogued, repeat the process for square two. Suppose the highest numbered move from square one was n. Then the lowest numbered move from square two will be numbered n plus 1. Repeat for all 64 squares and you'll have an ordered list of legal moves for the given position.

Let's see how this all works out with a tree like the one in Fig. 1. Notice that the tree has a total of 40 nodes: the starting node, three first-ply successor nodes, nine second-ply successor nodes, and 27 third-ply successor (and in this case terminal) nodes. With the help of our magic cave algorithm, the computer will be able to explore all this tree space without using much memory.

To start with, we'll need to store the number of x's at each ply. Since the computer can't make chalk marks pointing the way back, we will also have to save the game position at each ply. This will let us back up from false starts. Only three board positions (plus the starting position) need be stored in memory at one time. The stack may be conveniently used to store the current position at each level. When we go forward through the tree, we push the position we are leaving onto the stack. To back up, we pop the information for the previous ply off the stack.

Doubling the number of plies in the search only (roughly) doubles the amount of memory required, though the search time still mushrooms. That six-ply chess search we considered before could be accomplished with enough memory to buffer seven board positions (the starting position and six ply positions) and some additional data about each position. This is quite an improvement over needing to keep hundreds of millions of positions in memory at once!

Another necessity is a terminal node evaluation algorithm. For the great cave escape, you need only check for a visible exit. If there is one, assign that terminal node a one, otherwise, assign it a zero. Fig. 5 shows our tree again. This time an a has been put next to one of the terminal nodes to indicate that it contains the escape hatch, and our explorer's depth-first path through the cave has been indicated. If the search terminates when the egress is reached, the information currently saved for each ply will have drawn an implicit map pointing straight at the egress.

There are several differences between this search and one used by a computer playing chess. First of all, in a chess game there is no guarantee the search will terminate within a given number of ply. In that sense, our cave search is more analogous to solving a chess problem. A mate in two consists of three plies—I move, you move, I move, checkmate, too bad. So our underground adventure is somewhat analogous to solving a mate in two.

Another shortcoming of the analogy is that it doesn't take into account the fact that the opponent is trying to foil our plans. In the cave, we could take any turn we wanted. But in a chess game (or problem), the opponent will use his moves to steer the game away from our goals. What our cave analogy really depicts is a solution to what chess enthusiasts call a helpmate problem, one in which the opponent cooperates in picking the moves which bring about his demise.

Our cave trip involved a two-value terminal node evaluation algorithm—either we found an exit or we didn't. This is also fine for a help mate—either the final move checkmates, or it doesn't. But in a real game, two values wouldn't be enough to help select the most promising move.

We'll continue this look at the competitive tree searching algorithm, in more depth, next month. Now for the news...

The Second North American Computer Othello Championship

The tournament took place on May 15th and 18th near Chicago at Northwestern University, the home of former world champ, Chaos 4.5. The list of 14 competitors was impressive: eight micros and six mainframes. The mainframes competed from remote locations via phone link. One was a CDC CYBER 170/730. Other mainframes competing were a Data General MV/8000, an IBM 3033, a MODCOMP XTL, a Hewlett-Packard 3000, and a DEC 20.

The list of competing micros contained two Model I TRS-80's running at 5.3 megahertz (with the help of Archbold modifications), a Commodore 8032, an Apple II, an Atari 800, a Heath 89, an Ohio Scientific CIP, and a Hewlett-Packard 9826. The latter is an impressive piece of hardware. It's got an 68000 running at eight megahertz with a 128K RAM minimum configuration. It costs about $10,000.

Four countries were represented. Most of the programs were written by American programmers. Programs were also sent from Switzerland, Holland and Norway.

Microcomputers dominated the event. More specifically, TRS-80s dominated the event. The best a mainframe did was tie for fifth through eighth prize (with two other mainframes). The winning program was an experimental one written by Charlie Heath, author of Instant Software's Master Reversi program. It ran on a triple-speed TRS-80—mine.

The Swiss program, by Ander Kiarulf, came in second, running on a Commodore. The pretournament favorite, Peter Frey's Odin, came in third. It ran on the other TRS-80. All in all, it was a very exciting event, enjoyed by all present. ■

TRS-80 MODEL I [T.M.*]
GOLDPLUG - 80

Eliminate disk re-boots and data loss due to poor contact problems at card edge connectors. The GOLD PLUG - 80 solders to the board card edge. Use your existing cables.
CPU/keyboard to expansion interface $18.95
Expansion interface to disk, printer, RS232, screen printer (specify) . . . . . .$9.95 ea
Full set, six connectors. . . $54.95

VISA

EAP COMPANY
P.O. Box 14, Keller, TX 76248
(817) 498-4242
*TRS-80 is a trademark of Tandy Corp.

216

Maxell Floppy Disks
The Mini-Disks with maximum quality.

Dealer inquiries invited. C.O.D's accepted. Call FREE (800) 235-4137.

PACIFIC EXCHANGES
100 Foothill Blvd., San Luis
San Luis Obispo, CA 93401.
In Cal. call (800) 592-5935 or
(805)543-1037

207

Personal Publishing™

If you have ever thought about publishing your memoirs, the Great American Novel, your PhD thesis documentation for a computer program, or whatever, think about Intergraphics **Personal Publishing** service. It is the lowest cost method yet devised to get your words into print. Your Personal Computer, a modem, and a little "do-it-yourself" spirit are all that is necessary to access our fully automated computerized typesetting service.

For further information, write to

Intergraphics Inc.

106A South Columbus Street
Alexandria, Virginia 22314

430

ABS
ABS Suppliers
3352 Chelsea Circle
Ann Arbor, MI 48104
(313) 971-1404

B17 TAPE OPERATING SYSTEM will let you
- Save & Load programs 6X faster than Model-I.
- Save & Load Data Arrays over 800X faster
- Backup standard System tapes that load-n-go.
- Certify cassette tapes for B17 use.

$24.95 Specify Model 1/3 16K/32K/48K RAM. Inexpensive Upgrades available. 3rd year of sales.

B17 DISK/BAS is a Disk version. Lets you save any disk file to cassette at 3000 baud. Inexpensive way to backup your files. Works with any DOS. Includes tape certifier. Requires 32K RAM-up.
$19.95 Specify Model 1/3.

WORDSMITH Word-processing program in BASIC. A 'Trainer' for more complex W/P programs. Easy-to-use. Specify Tape/Disk version. Tape version requires B17 Tape Operating System (above). Disk version requires 32K RAM-up. Uses MX-80 Printer.
$19.95 Specify Model 1/3

Add $1.50 postage/handling per item. 173

$275
DISK DRIVES

5¼" 40 Track drive with case and power supply.

FLIPPY DRIVES ONLY $295.00
2 DRIVE CABLE $14.95
4116 MEMORY CHIPS 8 FOR $20

CORSAIR COMPUTER CORPORATION 200
7952 Highway 80 West
Fort Worth, TX 76116
817-244-8051

LYNX
TRS-80
MODEM
$229.95

LYNX Features:
- Compatible with both Model I and III
- No separate purchase required
- On a rear cartridge
- Auto Dial, Auto answer
- Works with any software including TF-80 by Microsoft
- Has CLEAR, BREAK and "CONTROL" keys
- Half or full duplex, variable word length, parity, and stop bits
- Dial from phone, keyboard, or memory
- Works with or without Hands In RS 232 use
- Can be placed on either side of Model III
- No tools needed to install

HIGH TECHNOLOGY AT AFFORDABLE PRICES

THE BOTTOM LINE 300

Orders & Information (603) 673-8857
Orders Only (800) 343-0728

12 Johnson Street, Milford, NH 03055-0423

ADVANCED BAUDOT RADIOTELETYPE
FOR THE TRS-80 MODELS I and III

Disassembled Handbook - Volume 5

- Knowledge of assembler is NOT required
- For both BASIC newcomers and advanced assembly language programmers. Model I/3
- Loads handle call, CTH, ring, CQ, etc. from BASIC to disk. (ONE TIME ONLY)
- Includes BASIC load pgm. for newcomers
- 60, 66, 75, and 100 speed Baudot RTTY
- Tape ahead in 80* to receive & transmit
- 21 prepared messages + 5 input messages
- Automatic Morse code. Do it* your call
- Store 25K bytes receive message automatically, retransmission if desired
- Edit above a must in Pencil
- 5 Chapters for new BASIC programmers
- 5 Chapters for advanced assembly programmers. Requires 48K + PORT zero decoder + Tu
- No RS 232C interface is required
- Newcomers SHOULD order disk & save Mode

VOLUME 5 - $20 ppd — WITH DISK $49 ppd
[US funds] add $8.50 overseas airmail

German - French - Japanese language editions

RICHCRAFT ENGINEERING LTD.
81 Wahmeda Industrial Park
Chautauqua, New York 14722 303
COD orders—US only (716) 753-2654

CALL FREE FOR
MEMOREX
FLEXIBLE DISKS!

Toll-Free 1-800-835-1129

Exceptional prices, quick delivery
Visa/Master Card/Checks/COD
Ask about our other TRS accessory and equipment buys

DATA SERVICES, INC.
DATA SERVICES, INC. 118
Computer services since 1970
P.O. Box 1157, Wichita, Kansas 67201-1157
(In Kansas, call 1-316-838-9021)

Shown: "80" MDX DEMI-CASE 174

Encloses LNW & MDX I & II
P.C. Boards, plus
Cabling, A/C Cords, etc.
Silver-gray Fiberglass

$32.50 plus $2.50 shipping
N.Y.S. residents add 7% tax

SYRACUSE R&D CENTER
Box 125, Dewitt, N.Y. 13214
Specializing in Electronic Packaging

See List of Advertisers on page 338

80 APPLICATIONS

by Dennis Kitsz

Hi. I'm back with the exciting conclusion of the homebrew ROM pack project for the Color Computer, printed circuit layouts and all.

If you'll recall last time, (way back in March), I presented several techniques for decoding the ROM pack memory of the TRS-80 Color Computer, an open area that extends from $C000 to $FEFF (decimal 49152 to 65279). By the way, when speaking about the Color Computer, I'll use the format $0000 for hexadecimal numbers instead of 0000H, since the former is the standard method used for the 6809 central processing unit. Each decoding technique presented in March has advantages, such as construction simplicity or protection of the CPU from overexertion.

Such strain is serious on the Color Computer. I'll tell you what happened when I overextended the CPU in my Color Computer...silent death. In testing one of my ROM boards, I plugged it in upside down *and* with the power on. Real smart. Gone in two seconds it was. Unlike more rugged machines, the Color Computer has no electronics in between the 6809 CPU and the expansion connector. Additional integrated circuits to buffer the signal would have protected the computer user's pocketbook, since 6809s are $20 a pop.

But back to the main topic. Several techniques were presented specifically to protect the CPU from this expensive strain. For this month I have prepared a printed circuit layout incorporating some of the best features of all the methods—it accepts either four 2716 2K-byte EPROMs (erasable, programmable read-only-memories) or four 2732 4K-byte EPROMs, and it uses only a single integrated circuit to select the memories.

Figure 1 is the EPROM selection circuitry, a 74LS138 demultiplexer, together with a few jumpers. I want to describe the selection process slowly, because the use of a demultiplexer to do electronic acrobatics is very satisfying, but takes some getting used to.

Recalling the job of a demultiplexer: it accepts a group of input signals, and from that information creates a unique output signal. In the case of a 74LS138, there are four inputs—one selects the 74LS138 itself, and the other three are decoded into an appropriate output. This circuit turns on an output in simple binary sequence, as in Table 1.

This pattern is perfect for any job where selection must be done sequentially. Consider next the question: What is to be selected? The multiplexer can be used with a variety of signals, but for ROM packs the use will require choosing sequential addresses. To select individual addresses is simple—use the lowest three address lines (A0, A1 and A2). Using A1, A2 and A3 will select two-byte blocks; using A2, A3 and A4 will select four-byte blocks. A3, A4 and A5 used with the 74LS138 select eight-byte blocks.

If this isn't clear, then consider that any contiguous group of addresses is a kind of window looking out over the whole memory map. The higher the window, the more of the memory vista comes into view. Looking into addresses 0, 1 and 2 gives the most limited view (one-byte blocks). Looking at addresses 13, 14 and 15 gives the widest view (8,192-byte blocks).

Transfer this to the problem at hand. The 16,384 addresses $C000 to $FFFF must be decoded; actually, the range is allowed to include only up to $FEFF, but the CTS* signal we are using turns off the topmost block automatically and can be ignored. What bits do not change over this entire range? Well, $C000 converted to binary is 1100 0000 0000 0000 and the ROM

Decoding Pattern of a 74LS138 Circuit.
Chip is Selected
(Pins 4 and 5 are low, pin 6 is high)

Input Pattern C B A	Output Selected Number:	74LS138 Pin Number:
0 0 0	0	15
0 0 1	1	14
0 1 0	2	13
0 1 1	3	12
1 0 0	4	11
1 0 1	5	10
1 1 0	6	9
1 1 1	7	7

Table 1

$C000	(11)	00	0000	0000	0000
$C7FF	(11)	00	0111	1111	1111
Common:	(11)	00	0...	....	....
$C800	(11)	00	1000	0000	0000
$CFFF	(11)	00	1111	1111	1111
Common:	(11)	00	1...	....	....
$D000	(11)	01	0000	0000	0000
$D7FF	(11)	01	0111	1111	1111
Common:	(11)	01	0...	....	....
$D800	(11)	01	1000	0000	0000
$DFFF	(11)	01	1111	1111	1111
Common:	(11)	01	1...	....	....
$E000	(11)	10	0000	0000	0000
$E7FF	(11)	10	0111	1111	1111
Common:	(11)	10	0...	....	....
$E800	(11)	10	1000	0000	0000
$EFFF	(11)	10	1111	1111	1111
Common:	(11)	10	1...	....	....
$F000	(11)	11	0000	0000	0000
$F7FF	(11)	11	0111	1111	1111
Common:	(11)	11	0...	....	....
$F800	(11)	11	1000	0000	0000
$FFFF	(11)	11	1111	1111	1111
Common:	(11)	11	1...	....	....

Table 2

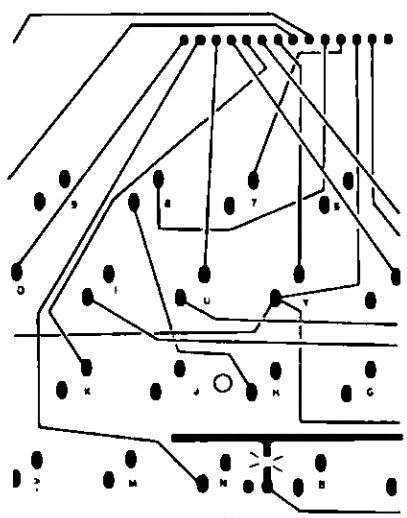


Figure 1

TCS MODEL III 48k 2 DISK

Fully assembled and tested systems that are software compatible and functionally identical to Radio Shack units sold at computer centers for $hundreds more. Includes DOSPLUS 3.3.

- CONTROLLER BOARDS are high quality double sided epoxy boards with gold plated contacts
- POWER SUPPLY is the finest switching type available.
- MOUNTING HARDWARE includes power and data cables.
- DISK DRIVES are Tandon, the same ones used by Radio Shack - 40 track, double density, 5 millisecond stepping rate.

The System comes with 180 day TCS limited warranty. $1795

$2095 MODEL III 48k 2 DRIVE SYSTEM with 720,000 bytes of storage

TCS uses 2 dual headed 48 track Tandon drives. You can convert your existing 40 track standard diskettes. This system includes free DOSPLUS 3.4(retail value $149).

MODEL III DISK EXPANSION KITS

KIT 1 Controller, Power Supply & Mounting Hardware	$379
KIT 2 Controller, Power Supply Hardware, 1/40 track Tandon	$577
KIT 3 Controller, Power Supply Hardware 2/40 track Tandons, 32k memory (everything you need for 2 drive 48k upgrade)	$799
KIT 3a Kit 3 but with 2/80 track drives (dual sided 40s)	$999
KIT 4 Tandon 40 track disk drive (bare drive)	$199
KIT 5 16k of high quality TCS memory	$39
KIT 6 32k of high quality TCS memory	$69
KIT 7 Disk Controller Board (supports 40/80 single/double sided drives	$349
KIT 8 Switching Power Supply for controller & 2 drives	$119
KIT 9 Hardware & Cabling kit for above components	$49

PRINTERS & ACCESSORIES

MATRIX PRINTERS

LINE PRINTER VII RS	$325
NEC 8023A	$495
C ITOH 8510	$495
OKIDATA 82A	$499
OKIDATA 82A w/tractor	$559
OKIDATA 83A	$769
LINE PRINTER VIII RS	$649
CENTRONICS 739parallel	$599
CENTRONICS 739 serial	$749
OKIDATA 84 / 200 cps	$1295
LINE PRINTER VI RS	$988
CENTRONICS 704	$1559
ANADEX 9500/01 2k buf	$1295
TEXAS INST. 810 Basic	$1595
LINE PRINTER V RS	$1549
Centronics 352 / 200 cps	$1795
Centronics 353 / duel mode, 200cps data proc., 50cps super letter quality	$2495

LETTER QUALITY
Daisy Wheel / Spinwriters

C. ITOH F-10 / 40 cps		$1595
DAISY WHEEL II RS		$1695
DIABLO	from	$2350
QUME	from	$1850
NEC SPINWRITERS		$CALL

LINE PRINTER8

CENTRONICS 6080/81 800 lines per minute	
6081 standard	$6399
6080 quietized cabinet	$7676

Epson

EPSON MX80	$CALL
EPSON MX80 FT	$CALL
EPSON MX100 FT	$CALL

FREE Graphtrax!!!

EPSON ACCESSORIES

GRAPHTRAX 80 option (bit-image/italics)	$79
CABLE Model I interface & Model III... $25 if purchased with EPSON printer	$35
CABLE & INTERFACE to Model I keyboard	$85
APPLE interface & cable	$89
GRAPPLER Apple hi resolution graphics	$Call
IEEE interface & cable (CBM/Pet)	$79
ATARI cable (must have 850 interface)	$35
SERIAL RS232 2k buffered int. card	$149
RS COLOR computer to Epson card/cable	$59

EPSON PACK II

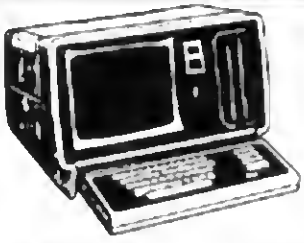
Screen oriented bit image graphics generator for Model III. Create your own characters, symbols, etc. Includes documentation.

$24.95 purchased with printer
$34.95 when purchased separately
$7.50 for update of Epson Pack I

Interfaces & cables available for most printers with any TRS80, Apple, Atari & most other computers. $$$$CALL FOR PRICES!

ALTOS COMPUTERS

TRS-80



MODEL II 64k ..... $CALL

MODEL 16 1 DRIVE .. $4499
MODEL 16 2 DRIVE .. $5199
DT-1 DATA TERMINAL. $629

Mod16 Memory Expansion $CALL

MODEL III SYSTEMS

Original 90 day manufacturer's warranty

Model III 16k	$818
Model III 32k	$918
Model III 48k	$1018
Model III 48k 2Dr.RS232	$2049

TCS Model III Systems have quality TCS memory and 180 day limited warranty. No warranty when you open computer or add internal components after you receive it

TCS Model III 16k	$788
TCS Model III 32k	$818
TCS Model III 48k	$848

COLOR COMPUTER

Original 90 day manufacturer's warranty

4k Level 1	$308
16k Level 1	$399
16k Extended Basic	$459
32k Extended Basic	$569
Color Disk....$479	Disk 1..$349

TCS version Color Computers uses original RS hardware and TCS memory. You get 180 day limited warranty on TCS Color Computer

16k Extended Basic	$439
32k Extended Basic	$499
32k Memory Upgrade	$79
Color/Epson int. & cable	$59
2k Buffer ColorGraph	$155

TANDON DRIVES

DEALERS! ASSEMBLERS! Quantity Purchases Invited!

Bare drives are available, or you can buy them with power supply, cabinet and cable, fully assembled and ready to plug in to your computer.

SINGLE OR DOUBLE CABINETS

40 track single sided	single $349
40 track single sided	double $489
80 track (dual sided 40 track)	single $389
80 track (dual sided 40 track)	double $599
180 track (dual sided 80 track)	single $499
180 track (dual sided 80 track)	double $949

Heavy gauge CABINET with POWER SUPPLY. External gold connector allows instant hook/detach from drive cable

BARE DRIVES ONLY

40 track single sided	$199
80 track (dual sided 40 track)	$299
180 track (dual sided 80 track)	$449
8 inch Slimline single/double sided	$CALL
Winchester Hard Drives, 5-30 meg	$CALL

WE WILL NOT BE UNDERSOLD!

CORVUS HARD DISKS CALL FOR PRICES $$$$$

Add 5, 10 or 20 megabytes of storage to your TRS80, Apple, Atari, Heath, Zenith, Intertec, IBM, S-100 and many others. One or several computers can share a hard disk. Get simultaneous access to data for multiple users. Available NOW at SUPER SAVINGS!

DEALERS...You can buy CORVUS from us for less. Call & $AVE.

CUSTOM SOFTWARE FROM TCS

Completely integrated **BINARY SEARCH TREE** programs now available. This series of programs fully implements the B-TREE structures including INSERTION, DELETION, EDITING & TRAVERSAL. No more sorting or long data file searches and yet files can be larger than memory. Duplicate keys are fully supported. Files can be retrieved in sorted order via B-TREE Traversal. Each of the programs come with fully commented source code so that you can use the modules in your own programming. A Screen oriented input routine is also included in each module. The following B-TREE programs are now available and each includes all of the mentioned modules and full documentation.

B-TREE Library (organize your home library keyed by author)..... $39.95
B-TREE Video (organize your video cassette library, prints labels, etc)..... $39.95
B-TREE Mailing List (keyed by name or zip,label printing,etc) $49.95

TCS If you buy somewhere else, you'll probably pay too much!

For fast, efficient service **Heart of** we can air freight from Dallas

TEXAS COMPUTER SYSTEMS

P.O. Box 1327 Arlington, Texas 76004-1327

★ Toll Free Number 800 433-5184

Texas Residents 817 274-5625

* Prices subject to change at any time
* No Tax out-of-state Texans add 5%
* Many items shipped FREE Call for quote

CALL FOR OUR FREE CATALOG!!

pack memory area counts up to binary 1111 1111 1111 1111 ($FFFF). The only bits that remain the same over the range are the two highest bits (A15 and A14) which are both set to 1. CTS* takes care of this entire part of the decoding, and it is available to us at the Color Computer's edge connector.

Now with 16K of ROM pack memory available, how can it be broken up into appropriate blocks? If the blocks are 2,048 bytes in size, then there are eight blocks in all; they are: $C000-$C7FF, $C800-$CFFF, $D000-$D7FF, $D800-$DFFF, $E000-$E7FF, $E800-$EFFF, $F000-$F755, $F800-$FFFF. Take a few representative blocks and see what bits the individual blocks have in common (other than A15 and A14, which are already decoded by CTS*). See Table 2.

In the case of 2K-byte blocks, three bits (address bits A13, A12 and A11) identify the block. If you isolate these three-bit groups, you discover they neatly count upward from 000 to 111 in binary. Therefore, feeding these address bits to the 74LS138 demultiplexer will result in signals which can be used for decoding eight 2K-byte blocks of memory. Perfect for 2716 EPROMs, which have addresses bits A0 to A10. You just have to remember that, although eight EPROMs is a theoretical maximum, for safety only four can be hung directly on the Color Computer's CPU.

So how about decoding four 4K-byte blocks to use 2732 EPROMs? First, have a look at the blocks' addresses: $C000-$CFFF, $D000-$DFFF, $E000-$EFFF and $F000-$FFFF. And then take a look through the "window" at the common bits (see Table 3). This time, only bits A13 and A12 are in common in each block. But the 74LS138 requires *three* inputs, and the 2732 memory uses A11. How can this demultiplexer be used here?

A little imagination lets the 74LS138 do the job anyway. First of all, address line A11 can be disconnected from the 74LS138 and fed directly to the 2732, as it should be. A13 and A12 are fed to the 74LS138, exactly as they were before. And the first input to the 74LS138 is *held high*. What does that do? Look at Table 4.

Notice that input A is always a "one" (high). Since input A doesn't change, only four patterns can be produced when this is the case (instead of the eight patterns shown in Table 1). Therefore just four outputs will ever be used on the 74LS138, and these can be used to select one of four 2732 4K-byte memories.

Look again at Fig 1. To use 2716s, then, address 11 (marked Y) is connected to input A (marked X); pin 15 (marked V) is connected to EPROM A (marked U), pin 14 is connected to EPROM B, pin 13 (marked S) is connected to EPROM C (marked R), and pin 12 is connected to EPROM D. All EPROM programming pins (Vpp, marked Z) are held high by a 1K resistor.

To use 2732s, address 11 (marked Y) is connected to all 2732 A11s (marked Z); pin 14 is connected to EPROM A, pin 12 is connected to EPROM B, pin 10 (marked T) is connected to EPROM C (marked U), and pin 7 (marked O) is connected to EPROM D (marked R). Input A of the 74LS138 is held high by a 1K resistor.

Building the Board

This is a double-sided, compact circuit design, and is not simple to construct. If it is your first project, don't. Boards—blank, with sockets, and/or in cases—are available from MSB Electronics, Drawer 766, Barre, Vermont 05641, (802) 476-7311.

If you decide to go ahead with the project, you'll need lots of patience and care. First of all, obtain sensitized double-sided printed circuit board, or sensitize your own. Sensitized board, sensitizing chemicals, developer and etchants can be obtained from Kepro Circuit Systems, 630 Axminister Drive, Fenton, MO 63026, or from Vector Electronics Company, 12460 Gladstone Avenue, Sylmar, CA 91342.

For details on producing printed circuit boards, refer to this column in *80 Micro*, December 1981. In addition, these hints will help you with the double sided boards, presented in Figs. 2 and 3:

1. Have a good negative made of these patterns using professional copying equipment. A local graphics shop or

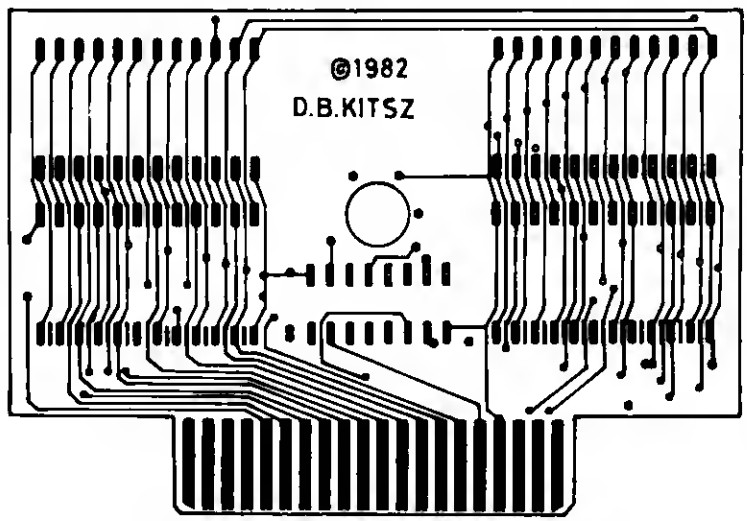


Figure 2

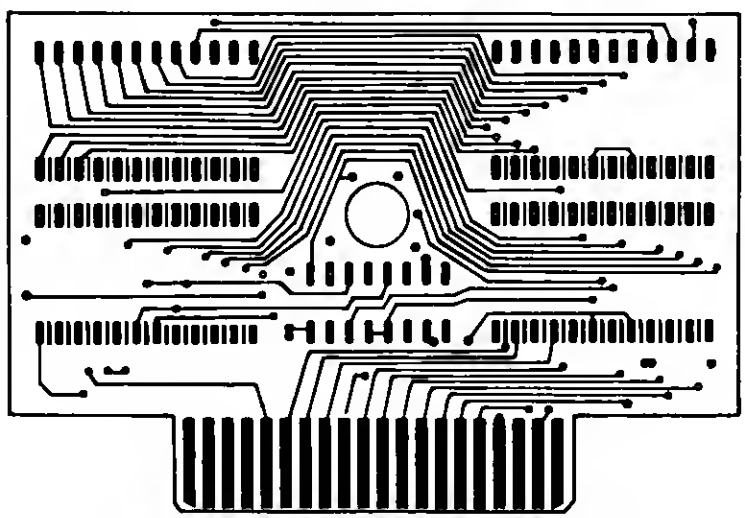
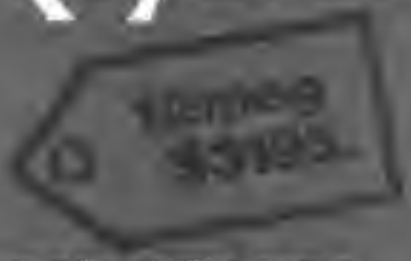


Figure 3

Quality Computer Services presents..

Hard Disk Systems



For TRS®, Apple®, Heath®, S-100, IBM.....
6, 12, 20, 40 and 80 Megabyte systems

Completely assembled and tested subsystem including:

- Switching power supply
- Winchester drive
- Host adapter card
- Sealed case
- Expansion
  The enclosure, controller and power supply have been designed to allow for future backup hardware or increased storage.
- Software
- Auto attach CP/M®
- Hard disk utilities
- Real time clock
- Formatting program
  Assigns alternate sectors for any weak sectors detected during formatting assuring the lowest possible error rate
- Warranty: The system has a full one year warranty on all parts and workmanship
- Also available: attach for TRSDOS, OASIS®, Apple DOS
- Optional 5¼" floppy (shown)

See local dealer or call:
Quality Computer Services
178 Main Street
Metuchen, New Jersey
201-548-3135

QCS Inc.

- Quantity discounts available. Distributor, Dealer and OEM inquiries invited.

Toll free number: 800 631 5944

®OASIS is a trademark of [illegible] ® is a trademark [illegible]

newspaper can help out.

2. Line up the negatives and verify the alignment, then tape them together along two perpendicular sides. This forms a pocket into which the sensitized board can be inserted.

3. Use a vacuum table or high-quality photo proof frame for exposure, and use a carbon arc lamp if possible.

4. Make sure both your developer and etchant are at the proper temperature; cool etchent will leave solder hairs and warm etchant will remove the emulsion and break traces.

5. Use a #68 drill bit for integrated circuit pads and a #72 drill bit for through-holes.

6. Solder a wire very carefully to both sides of all through-holes. Solder sockets and the integrated circuit to both sides of all pads, as shown in Fig. 4.

7. Wash a light plating of solder across the edge connector contects, and clean the flux off.

8. Test for shorts before inserting the cartridge for a test.

By the way, this board will fit inside Radio Shack's ROM pack cartridge shells if you cut out the center hole. In two months (see the end of the column), I'll present some software in ROM, four additional output ports using 6821 peripheral interface adapters (PIAs), and some other interesting items.

Misinformation and Silliness

In the past few months speculation and rumor about the Color Computer have proliferated. Misinformation and silliness have been perpetrated everywhere, and Color Computer users are the victims. I'd like to risk making some observations.

I'll start with publisher Wayne Green's "Remarks" in the January *80 Micro*. Now maybe Wayne is right when he says that Tandy Corporation might phase out the Color Computer; eventually, that's inevitable. He's certainly right when he says that whatever the situation, Fort Worth wouldn't acknowledge the whens and whys.

But when he bases his views about the popularity of the Color Computer on author submissions to *80 Micro* and Instant Software, the logic turns into hunch. Until recently, *80 Micro* simply hasn't been the place to look for Color Computer information, if I'm to believe Color Computer users with whom I've spoken. These people subscribe to *Color Computer News*, *The Rainbow*, *68 Micro Journal*, and *Compute*. The latter magazine even expanded its coverage from 6502 systems to include 6809 systems in order to keep pece with the demand for information on the Color Computer—information that couldn't be found elsewhere.

No software? Just walk into eny computer store, even those here in Vermont,

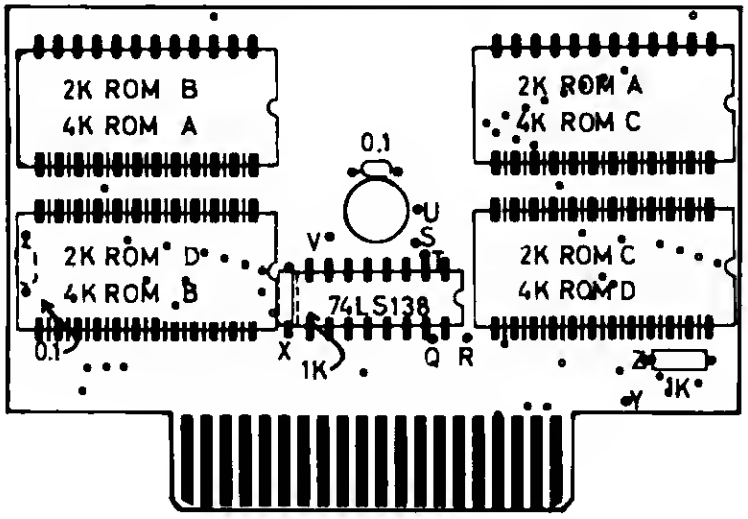


Figure 4

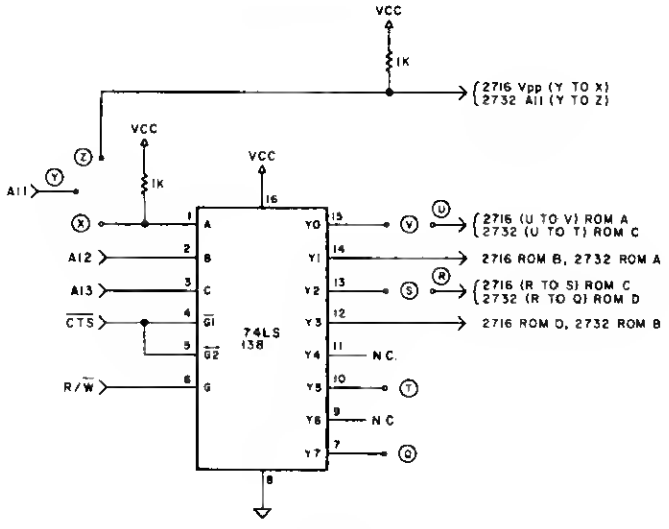


Figure 5

$C000	(11)	00	0000	0000	0000
$CFFF	(11)	00	1111	1111	1111
Common:	(11)	00	....	....	....
$D000	(11)	01	0000	0000	0000
$DFFF	(11)	01	1111	1111	1111
Common:	(11)	01	....	....	....
$E000	(11)	10	0000	0000	0000
$EFFF	(11)	10	1111	1111	1111
Common:	(11)	10	....	....	....
$F000	(11)	11	0000	0000	0000
$FFFF	(11)	11	1111	1111	1111
Common:	(11)	11	....	....	....

Table 3

Decoding Pattern of a 74LS138 Circuit.
Chip is Selected
(Pins 4 and 5 are low, pin 6 is high)
(Input A is held high)

Input Pattern C B A	Output Selected Number:	74LS138 Pin Number:
0 0 1	1	14
0 1 1	3	12
1 0 1	5	10
1 1 1	7	7

Table 4

whose total population is a fraction of just the work force in Silicon Valley. The walls are covered with Color Computer software—most of it far more sophisticated than what was available for the Model I at an equivalent stage of its existence.

Furthermore, Radio Shack's disk interface is here. It works and, with it, support from Fort Worth seems to be increasing. Exatron—home of the Stringy Floppy—has introduced disk interfaces and its own CCDOS; ROM packs are appearing from every direction. Hardware upgrades are being produced, and a full-blown Flex operating system ("the CP/M of the 6809") is being introduced as you read this. You can obtain assemblers, text editors, monitors, control packages, and software of every dimension.

Why is this? Probably because the Color Computer contains a 6809 processor—and most of the current generation of microprocessor programmers spent a lot of time learning what they know on its ancestor, the 6800. They're not Z80 graduates, so the "80" in *80 Micro* is a natural barrier to Color Computer article submissions.

If Radio Shack decides to phase out the Color Computer—perhaps because it plans to push its "Model 16," or whatever the new 16-bit, multi-processor personal monster is to be called—it isn't because the user base was missing. But then I have about as much inside information as Wayne does when it comes to Radio Shack marketing strategy...and I'm just guessing.

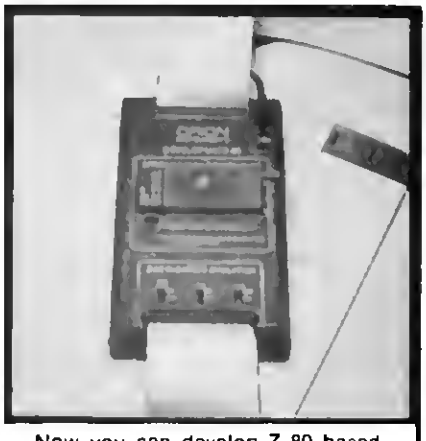
The little information I do have came from an enjoyable phone call with Jon Shirley, Vice President of computer marketing at Tandy. He was open and helpful, contrary to the picture painted of mysterious Tandy Towers. Yes, the intended market for the Color Computer was a popular one. Yes, the number of serious users was a surprise. Yes, these Color Computer users will receive Shack support, too. That news is more than welcome. I believe Jon Shirley.

But in December's *TRS-80 Microcomputing News*, one of Radio Shack's unnamed authors took a gratuitous slap at those who try to assist users with new approaches, fixes, and upgrades. Some of us happen to believe that the Shack—a relative latecomer to digital equipment—isn't the only font of hardware and software wisdom, nor necessarily of philosophical validity. So we get weary of Tandy Tower's suggestions that non-Shack peripherals, upgrades, modifications, and other enhancements are going to screw up users' machines. Because of the distinct information vacuum maintained by Radio Shack about its plans, you can expect other publications to support the machine. In the past, most of them have been right on the mark, even where Tandy folks were wrong or at best clandestine. We authors—regular columnists or occasional contributors—do a good job. We have to, or we'd get raked over the coals in print. The Tandy boys aren't going to publish self-criticism in their newsletter.

You think I'm blustering? You'd like a case in point? Let's get this one straight. There is no such thing as a 32K RAM chip, and the anonymous author of "Rumors, Rumors" (*TRS-80 Microcomputing News*, page 34) better shape up if he wants us to believe he's got better information than we "experts" do. Here's the real story, folks. Currently being produced are three

CONVERT YOUR TRS-80 MODEL-I OR III INTO A

DEVELOPMENT SYSTEM



Now you can develop Z-80 based, stand-alone devices such as games, robots, instruments and peripheral controllers, by using your TRS-80 as a development system. The DEVELOPMATE plugs into the expansion connector of your TRS-80 and adds **PROM PROGRAMMING** and **IN-CIRCUIT-EMULATION** capabilities to your system (with or without expansion interface).

Complete instructions and sample schematics are included to help you design your own simple stand-alone microcomputer systems. THESE SYSTEMS CAN BE AS SIMPLE AS FOUR ICs: one TTL circuit for clock and reset, a Z-80, an EPROM, and one peripheral interface chip.

When the In-Circuit-Emulation cable is plugged into the Z-80 socket of your stand-alone system, the system becomes a part of your TRS-80. You can use the full power of your editor/assembler's debug and trace program to check out both the hardware and the software. Simple test loops can be used to check out the hardware, then the system program can be run to debug the logic of your stand-alone device.

Since the program is kept in TRS-80 RAM, changes can be made quickly and easily. When your stand-alone device works as desired, you use the Developmate's PROM PROGRAMMER to copy the program into a PROM. With this PROM, and the Z-80 in place of the emulation cable, your stand-alone device will work by itself.

The DEVELOPMATE is extremely compact: Both the PROM programmer and the In-Circuit-Emulator are in one small plastic box only 3.2" x 5.4". A line-plug mounted power supply is included. The PROM programmer has a "personality module" which defines the voltages and connections of the PROM so that future devices can be accommodated. However, the system comes with a "universal" personality module which handles 2758, 2508 (8K), 2716, 2516 (16K), 2532 (32K), as well as the new electrically alterable 2816 and 48016 (16K EEPROMs).

The COMPLETE DEVELOPMATE 81, for Model I, with software, power supply, emulation cable, TRS-80 cable, and "universal" personality module $329

DEVELOPMATE 83, Model III version, same as above $329

PM2 PERSONALITY MODULE for 2732A EPROM $15

PM3 PERSONALITY MODULE for 2764 EPROM $15

ORION
INSTRUMENTS
172 Otis Avenue, Dept. M, Woodside, CA 94062
(415) 851-1172 ↙ 151

Master Charge and Visa phone orders accepted
California residents please add 6 % sales tax

↙ See List of Advertisers on page 338

major kinds of dynamic memories: 4K and 16K dynamics, and 64K dynamic/pseudo-static memories. Now, either Radio Shack is putting in top-of-the-line 64K memories and wasting half of them, or somebody gave them a deal on 64K "dropouts"—you know, where one bank of the memory inside the chip doesn't work, and you get them cheap from a supplier who would otherwise dump them into scrap barrels. Then you arrange to have them marked to your specifications, and zap!, instant 32K chips are invented.

Frankly, I don't believe that's what Tandy is doing, and recent units suggest that prime 64K chips are used throughout. I was skeptical about this, too, since it looks like dropouts are what the Tandy folks bought for the original character generator with a bum lowercase "a" in the Model I—until they got caught when users started installing their own lowercase. (If you want to read about Radio Shack getting caught with its hands in the cookie jar, read *Opinion 80*, #2, December 1981, published by The Alternate Source.) At first, funny RAMs probably explained why you find a "bank select" jumper in the E revision boards of the Color Computer; if both banks work on the 64K memories, why bother with the jumper? If you're the company that got the deal, you had better know which bank of your chips works and which doesn't, right? Let's quash that rumor now—as far as my sources can tell, all of those 64K RAMs are good in new units.

Yet as the Tandy writer says, I can't tell you "what standards or specifications those chips have to meet to be used" in TRS-80 machines. But who says those standards are higher or lower than off-the-shelf ones? If I were the Tandy engineers, and knew that the Color Computer only needed half of a 64K RAM, I'd probably be tempted to buy dropouts for just that reason. If I'm running a company that advertises a 32K RAM upgrade, that's all the buyer should expect to get; I can understand that viewpoint. But I think they should come clean with exactly what's inside their product, and not call these things "32K" RAMs when they aren't.

Frankly, the Shack writer's analogy that buyers don't need to know the weight of cardboard in record jackets and the color of the label is inappropriate and simplistic. I don't worry about plastic in the Color Computer case, or the color of the keycaps. The real, unclouded, indisputable issue is this: Exactly how much hard information am I allowed to have about a product on which I've spent hundreds of dollars? And how much has Tandy Towers told us?

The answer to the first question depends on whom you ask. No matter what I buy—amplifier, toaster, recording tape, car, bread, typewriter, water pump, garden seeds, photochemicals—I expect to be able to discover all the information necessary to use and maintain the product myself. If my big-boy tomatoes won't grow, I want to know why; if I want them bigger, I want to know how. I want my stereo manufacturer to tell me what to expect from my system, and I subscribe to audio magazines to tell me how to improve that system. I know that the formulas for my photo chemistry will be available if I ask for them. And since I drive an 18-year-old car, I have to have enough information to keep it going myself.

Here's my point stated another way. Perhaps America has become a throw-away culture; but where I live in New England, that unfortunate attitude hasn't caught on. The motto here is "use it up, wear it out...then use it for something else." I repair 20-year-old table radios for townfolks because they would rather pay for a repair than spend the same amount on a new radio. Model I owners still feel the same way, because—judging from my reader survey—they feel threatened by Radio Shack's abandonment of the product. So they're hungry to know everything they can.

But what has Tandy told us? Actually, they have revealed quite a bit. Their service and technical manuals are excellent examples of product support—far superior to anything you get from other manufacturers. Commodore, Apple, and all the rest hold the information close to their chest, but Radio Shack comes straight out with schematics, memory maps, technical descriptions, and detailed specifications. The Model III manual is a true star, with all the manufacturer spec sheets included.

The problem is not how they describe, but how they support the product. It's nothing new when manufacturers say "use only Squat brand whatsis in this fine Squat dingus." But the Squat salespeople usually can tell you if a non-Squat whatsis will work with a Squat dingus. Tandy not only doesn't want to tell you; it won't tell you, and most of its sales and service force can't tell you. Those who can will—on the side. But there are encouraging examples: A few managers were brazen enough to use the NEWDOS operating system in place of TRSDOS at a computer show, simply because NEWDOS wouldn't crash the software they were demonstrating. These salespeople had computers to sell, not paranoid philosophies to follow.

Okay, back to the main subject. The writer goes on to say that "there's nothing wrong with the 1.0 version (of the Color ROM) in the Color Computer." Maybe not, but that version did have to be patched to use their own line printer's graphics. There are changes in the joysticks, and doubtless a host of small changes (I wish they'd cure the need for spaces after variable names before keywords!). But most important is what the author left out: The 1.1 ROM has a different initialization routine to inform the synchronous address multiplexer (SAM) whether there are 64K RAMs installed in the computer!

The reason for Basic 1.1 can be pieced together from the evidence: The original Color Computer technical manual didn't have 32K upgrade circuitry, which suggests either they weren't planning an expansion, or were going to use a piggyback method, since the 1.0 ROM could support nothing but 4K or 16K memory chips. But the Shack had to make the upgrade easy and cheap for them and still justify the hundred bucks it cost the user. The answer evidently lay in the 64K chips, and new ROM support. In the process, some 1.0 inefficiencies were cleaned up—like not supporting their own line printer completely.

Oh yes. The newsletter author can't guarantee that the 32K piggyback will work with the 1.1 ROM. Well, it does work, and he's welcome to come see functioning units the next time he's in Vermont. With thousands of users going the piggyback route, it would do the Tandy people a world of good to take a look at it. But then, maybe they did look...and these are scary words to keep wavering users in the Shack flock.

Remember, we non-Tandy "experts"—whom Radio Shack's anonymous author derogates—are the same experts who brought users what they wanted: the first Model I and Color Computer lowercase; the first revelation of all the disk system mysteries; the first debugged disk operating systems; reliable faster CPU speeds in both Model I and Color; memory upgrades for all machines; working system expansions for Model I; almost everything that's an upgrade in the Model III; double-density disk systems; and more.

When you read the Tandy comments, remember that the non-Shack experts also told you what was really wrong when your memory crashed, or when your keyboard bounced or stuck, or when your tape wouldn't load. And told you how to fix the problems long before the Shack did. But we didn't do it Tandy's way—which means that when they eventually got around to it, their method was the so-

Scanned by Ira Goldklang - www.trs-80.com

SAVE MONEY

If You Own A 16K Model III.

You can easily expand your capabilities with our low cost disk expansion

MODEL III DISK DRIVE EXPANSION KITS*

• Switching power supply • storage to 2 Mbytes • supports TRSDOS • 32K RAM expansion • double density disk controller • goldplated edge card connections • includes TRSDOS and manual, all cables and necessary hardware, installation manual • fully tested and burned in • 90-day warranty

M3DK0 - Drive kit with one Tandon single-sided 40-track drive **$550.00**	M3DK2 - Drive kit with two Tandon double-sided 40-track drives **$995.00**
M3DK1 - Drive kit with two Tandon single-sided 40-track drives **$765.00**	M3DK4 - Drive kit with two Tandon double-sided 80-track drives **$1,195.00**

*TANDON DISK DRIVES

DRIVES WITH CASE & POWER SUPPLY		DRIVES W/O CASE & POWER SUPPLY
~~$289.95~~ $249.95	TM100-1 - single-sided 40-track drive - 102 Kbytes single density 180 Kbytes double density	~~$235.00~~ $199.95
~~$399.95~~ $349.95	TM100-2 - double-sided 40-track drive - 204 Kbytes single density - 360 Kbytes double density	~~$345.00~~ $299.95

CABLES

2-Drive.....$23.95
4-Drive.....$33.95
Extender Cable.....$14.95

•we will install any of our kits in your computer for only $49.95

•48K Model III

Limited Supply Now Available For The Low-Low Price Of $1795.00

Includes all the standard basic features of the TRS-80* Model III with 48K of RAM and disk expansion Kit with two 40 track double density Tandom disk drives. Completely compatible with TRSDOS™

with 2 double sided drives

ONLY $1995.00

* TM of Tandy Corp

DEALER INQUIRIES ARE INVITED

Compukit

P.O. Box 306
Kemah Texas 77565
713-334-6125
or 713-474-7342

•call for details

EXPERIENCED TECHS AVAILABLE

AMERICAN EXPRESS VISA MasterCard

We accept: Visa, Master Charge, Certified Checks (Personal checks require three weeks clearance), Money Orders, and C.O.D.

455

called "standard." Now *their* 32K upgrade (nine months late) is the "standard." Curious how they insist on setting post facto standards.

I started this tirade by suggesting that misinformation and silliness was rampant. I think all of us could do well to re-examine our reactions. Radio Shack should loosen up and recognize printers like Epson, storage devices like the Stringy Floppy, and the host of significant non-Tandy peripherals. They can draw the line wherever they want to. Non-Shack suppliers should stop knocking a hierarchy-bound company for things it can't help, and encourage Tandy to come up front without worrying about being torn up by criticism.

"I took out my nippers and made the same cuts. . . . everything was perfect."

Reader Survey Results

What a change. Last year, two dozen people responded to the reader survey. This year, nearly 500 suggestions arrived. . . and the results were surprising. Color Computer, 68%; most of the rest Model I (one LNW user, and three Model III users demanding I buy one). Hardware and software split right down the middle for both computers.

Among the suggestions for the Color Computer: an EPROM programmer; lots of Assembly language utilities; real-world interfacing; a way to add more RAM, or bank-select blocks of it; 64- or 80-column screen (see last month's Exclusive Oracle for more on that topic); Atari-style joysticks (sounds good); speech input (see Bill Barden's article in the February issue of *Byte*); an external calculator keyboard; system diagnostics; a parallel printer interface; a bar code reader (not likely in this column, sorry); CPU speed-up (see updates below); a real-time clock; a light pen; and many more.

Although Model I owners had very few suggestions, they seem to have progressed since last year, with requests for double-density disk controllers (out of the range of this column); a Model III ROM upgrade for the Model I (perhaps); system reliability enhancements; more machine language utilities; a CP/M modification.

One reader expressed a list of Model I needs: a high-resolution color display, an EPROM bootup, a ROM pack for games, analog input, a faster processor. Model I owners, hear me! I've got a Model I, as you all know, and I love to use it. I'm writing this article using it. But I got a Color Computer precisely because I wanted what this reader wants. . . and instead of defending the Model I where it is basically indefensible, I joined those who added an inexpensive Color unit to increase computing power.

Color Computer High-Speed

Color Computer high speed: A gentleman whose letter I have misplaced (drop me a card so I can let the readers know who you are) wrote questioning my recommendations about Color Computer high speed problems. He asked, why replace the PIA's and/or RAM if they never run at high speed? He just cut a couple of capacitors and the computer worked fine. I had another look at my schematic; his cure was better, so here it is, with some explanations:

The four speed modes in the Color Computer are controlled by the synchronous address multiplexer (SAM). The memory map is divided into two sections, RAM and ports (hex 0000-7FFF and FF00 to FFFF) and ROMs 1 and 2 (hex 8000 to FEFF). When the computer is turned on, the "all slow" mode is selected. POKE 65495,X (X is any value; 65495 is FFD7 hex) turns on the "fast ROM" mode. That is, only the area from 8000 to FEFF (32768 to 65279) travels at double speed (1.8 MHz).

That means the RAM and the ports are still traveling at slow speed. So why replace them? My original answer was empirical—because it cured the problem. But this reader's solution was better. He noticed that two capacitors (C73 and C75) were placed right across the clock lines (E and Q*) to ground, and that pulling these out made things work. He wasn't sure why.

I took out my nippers and made the same cuts. Sure enough, everything was perfect. It seems the clock rise and fall time was being pulled so far out of spec that when the "address dependent" mode was invoked, the clock couldn't get itself straight fast enough to access the PIAs. Hence, the PIAs saw a fast clock and didn't have their data ready for the CPU. Same with the RAM, which was being accessed by a very messy clock, and had problems getting set up properly.

Then I tried "fast-fast" speed: POKE 65497,X. The screen went wild; I thought it was lost. But no. . . POKE 65496,X (typing blindly) brought everything back. ROM, RAM and ports were accessed successfully at 1.6 MHz. The screen went wild because the SAM register at 65497 (hex FFD9) kills transparent screen refresh, meaning the screen can't be accessed by the video display generator (VDG) and—here's the bummer—dynamic memory can't be refreshed. You can't use it for more than a second or two with great memory. So here are the rules for Color Computer high speed: 1. Cut capacitors C73 and C75. They may be replaced with 10-15 pF capacitors if necessary to keep noise down. 2. Test the system with POKE 65495,X. 3. If the computer locks up, replace the CPU with a 68A09 or preferably a 68B09. 4. Check the keyboard, MOTOR ON, and SOUND commands next. 5. If the computer locks up, replace the PIAs with 68A21 or 68B21 chips. 6. Enter this program:

```
10 CLS
20 PRINT"ENTERING ADDRESS DEPENDENCE"
30 POKE 65495,0
40 FOR N = 0 TO 255 : POKE 1300,N : NEXT
50 PRINT"RE-ENTERING SLOW MODE"
60 POKE 65494,0
70 FOR N = 0 TO 255 : POKE 1300,N : NEXT
80 GOTO 10
```

7. Remember never to CLOAD or CSAVE in the 65495 mode; always return to normal speed with 65494 from 65495.

POKE Value	RAM/Ports	ROM	Refresh
65494,x	slow	slow	on
65495,x	slow	fast	on
65496,x (no!)	fast	slow	off
65497,x (no!)	fast	fast	off

There's more to the story. Cutting the capacitors also reduced the heat generated by the SAM chip, meaning I could successfully remove the heat sink I had added (November Applications) for high-speed use.

Some Updates, Some Hints

As noted above, Color Computers can be upgraded to 32K RAM using 64K dynamic memory chips. You must have an E-revision board (the serial number's at the bottom right under the metal shield), and a 1.1 Basic ROM (the sign-on message tells you which version you have). If you have an E board, you probably have the ROM. Move all the jumpers from the 4K or 16K positions to the 32K positions, remove the 4K or 16K chips, insert the

MANUFACTURING CONTROL SYSTEMS

MICS module - Manufacturing Inventory Control IS reports for inventory, purchasing, and stock-room control. "Reserved" parts feature.

SOMP module - Bill of Materials Processor for complex product control of inventory.

SHOC module - Manufacturing Shop Order Control Order scheduling and tooling/shipment reporting.

LABP module - Labor Collection/Performance Rptg Daily, weekly, and monthly labor reporting by employee, job and overhead accounts, and department and operation. Actual job costing reports.

JCST module - Manufacturing Job cost reporting Job status and completion reporting with performance to standards, variance reporting, overhead determination monthly and year-to-date

All modules for Models I and III, IIs minimum systems. Master menu driven - full operator prompted. Expandable to fit your growth needs.

Note: I modules from $[illegible], Model III from $[illegible]

Send for catalog of ELTEC business modules

ELTECH Associates

specialists in manufacturing business systems
24[illegible] Moreno Drive, Los Angeles, Ca. 9[illegible]
(213) [illegible]-[illegible]

↙344

TAKE A BYTE OUT OF YOUR SOFTWARE COST!

Save 20-40% on all major Brands of micro-software-hardware

SPECIAL

NEWSCRIPT ..... $ 119.95
DOSPLUS 3.4 ..... $ 127.48

NOW CARRYING HARDWARE

C. ITOH $1599.00
NEC GREEN SCREENS ..... $ 160.00

SOFTWARE GALORE backs its commitment to service and quality to its members.

If you buy any software from us and you are unhappy with it just return it for a full credit on your next order. 90 day unconditional warranties on Software.

↙388

SOFTWARE GALORE
[illegible]
P.O. Box 19005 • Alamo Station, California 9[illegible]

color communications

Communicate in color with the MICRO-CONNECTION™ direct connect modem for the TRS-80* Color Computer. Run 300 bps serial printers to download color files. Send E-mail, chat, buy merchandise, access the Source* and other exciting data bases with the MICROCONNECTION™ for the TRS-80* Color Computer. $199.50

the microperipheral corporation
2643 151st Place N.E.
Redmond, WA 98052
(206) 881-7544

[illegible]

↙298

BUILD THIS DIGITAL PLOTTER AT HOME FOR UNDER $200.00

FOR $19.95 YOU GET PRO QUALITY BLUE-PRINTS, SCHEMATIC, PARTS LIST, ASSY. INSTRUCTIONS AND NECESSARY SOFT-WARE FOR MODEL I OR III. ACCOMMODATES PAPER UP TO 18 X 24. ADD $9.95 FOR 10 PROGRAMS INCLUDES PLOTTING GRAPHS, RADII NUMBERS A 3-D CUBE AND MORE.

$1.50 CHECK OR MONEY ORDER TO: ↙352

P.M.W. 7741 ALABAMA AVE. #8 CANOGA PARK, CA. 91304

COLOR COMPUTER

NEW for the Color Computer TRS-80
'COCOCASSETTE' SUBSCRIPTION SOFTWARE

ENJOY A MONTHLY COLLECTION OF 8 to 10 PROGRAMS!

[illegible]

[illegible] 616 396-7577

SUBSCRIPTION SOFTWARE

[illegible] ↙408

T & D SOFTWARE P.O. BOX 256 C • HOLLAND, MICH 49423

TRS-80 DISK and TAPE USERS!!!
Protect your investment in disks and tapes! END loading problems. One **TOOL** does it ALL!

Tape Reproduction System
Tape or Disk Utility for Model I or III

- Read TAPE and/or DISK
- Write TAPE and/or DISK
- Verify TAPE written will load
- **ANY** TRS-80 protocol TAPE
- Identifies BASIC, SYSTEM, EDTASM
- Change program name as desired
- Select tape speed HI/L (Mod III)
- Select tape port 0/1 (Mod I)
- **OFFSET** load addresses
- **UNOFFSET** load addresses if offset
- Displays operational STATUS plus
  - Diskette directory (0-3)
  - Load Map (start-end addresses)
  - NAME, LENGTH, FORMAT of data
  - START, END, EXECUTE addresses
- Automatic protocol conversion
- **SINGLE** disk drive copy (Mod I)
- Archives on TAPE for DISK or TAPE
- Run TAPE programs from DISK
- 16 Menu-driven features in all!
- DISK features require TRSDUM

TRSTUM-16K tape systems ONLY $16.95
TRSDUM-1 drive TRSDOS systems ONLY $17.95
Specify Model I or III - add $1.00 postage and handling
Send check, money order or SASE to

CRIL Microtools
Software [illegible] for the 80's
14835 N. First Avenue
Phoenix, AZ 85023

TRS-80 & TRSDOS - trademarks of Tandy Corp

↙415

• UTILITIES •

MISSING COMMAND ON THE MODEL I
FORMS
No more printing of the paper. Still available in [illegible] available memory. Change paper size with [illegible] Basic. Model I Disk $[illegible]

ZAPPER
NEWDOS 80 Ver. 2 users - Zaps your NEWDOS 80 Ver. 2 files without using SUPERZAP, then [illegible] these zaps to your files. Update your old, outdated NEWDOS 80 Ver. 2 changes single density to double density. Model I must have double density installed to use all features. $[illegible]

SMARTT2
Smart Terminal Program written in Basic with Machine Language I/O routines. Full featured. Make your own modifications - supports [illegible] Easily implemented [illegible] Model I or III Disk $[illegible]

LISTER 4
Prints Listing [illegible] LISTs in ASCII and Compressed Basic programs to your printer with many [illegible] speed. Model I Disk $[illegible]

Do your own word processing at Heritage Crafts. Money Order or C.O.D. Shipped Postage Paid. Add $2 [illegible] C.O.D.

CALL - Custom Software for your application - CALL

H.J.S.
625 Cedar Street — Rock Springs, Wy. 82901
Phone (307) 362 6742

NEWDOS, 80, SUPERZAP trademarks of [illegible]

↙404

THE KWIK CURE

For S-80 Cassette Blues!
Cassette Operating Systems

KWICOS:
- Write, read, verify, search, catalog of both basic and machine code pgms
- Fast 2x 6x Mod I, 2250 Baud Mod III
- No mods or add ons required
- Visual guide for easy volume set
- "Chain" load basic programs
- Allows long titles and passwords
- No garbage - Adjustable debounce
- Built-in "backup" to copy KWICOS
- Mod I: ok with LemonAid Loader*
- Mod III: Command control of break

Cassette for 16/48** ..'29.00 ppd

I/O routing, clock, cassette rutn

KWIKIT: (Mod I KWICOS...for BASIC only)
- Double speed Mod I, 2200 Baud Mod III
- Works even with X2X Mod III CPU
- Uses only 880 bytes of memory
- Load, verify, catalog, search and more

for 16/48** 16/32 Model 2 for DEBOUNCE

KWINK:
- Makes auto-loading hi-speed copy of any SYSTEM program. Low or high memory...doesn't need KWICOS.

for 16k 48k **12.00

*TM Lemonaid Tech Services (specify model)

KWIK Software Dept. M
Box 328 Solivar, MO 65613
Phone (417) 326-7154

↙359

COMPUTER ACCESSORIES OF ARIZONA PRESENTS
PRODUCTS FOR THE
"TRS—80* COLOR COMPUTER"

[illegible]

COMPARE PRICE — COMPARE VALUE
YOU'LL BUY FROM
COMPUTER ACCESSORIES OF ARIZONA
5401 E. VOLTAIRE DR.
SCOTTSDALE, AZ 85254

[illegible]

↙382

↙See List of Advertisers on page 338

Decision Science Software

OPERATIONS RESEARCH	STATISTICAL PACKAGE	ECOPAK
LP	REGRESS	FUTURE VALUE
DYNAM	MULTI REG	ANNUITY
NETWORK	MATRIX	EFFECTIVE
PERT	FUTURE	DEPR
EOQ	FORECASTING	SALVAGE
LOT SIZING	MARKOV	NET PRESENT VALUE
FORECASTING	QUEUE	
DECIDE	SIMULATION	DCF RATE OF RETURN
MRP		
TRANSPORTATION		

TRS-80* model I and III

APPLE II

16K-1 Disk Drive
-minimum system requirement

$49.95 to 249.95

for information
DECISION SCIENCE SOFTWARE
865 Castle Ridge Road
Austin, Texas 78746
(512) 327-1463

MasterCard VISA

*trademark of the Tandy Corp

394

80 APPLICATIONS

eight 64K chips, and you're ready to go.

Are you a disgruntled LNW system user? Many readers have written to say that support from LNW Research has not been forthcoming, with letters unanswered and phone calls ignored. My own requests for information have gone unanswered, so I can empathize with those complaints. I understand Herv Pennington (of *Disk and Other Mysteries* fame) is giving the LNW folks some essential lessons in customer relations and customer support, but until those lessons show signs of being learned, users might be relieved to know that an LNW-80 and LNW System Expansion support group is being formed by Steve Redmond of Burlington, Vermont. Steve says, "I don't know as much as I'd like to, but I hope what I can do is put users in touch with sources of help." He would like to hear from both LNW users with problems as well as LNW users who are familiar enough with the machine's operation to help others. I agree with Steve that the LNW-80 is a fine computer, and that it deserves an active nationwide user network. Write to Steve at 456 North St., Burlington, VT 05401.

Lately a publication called *The On-Line Computer Telephone Directory* has been dropping in my mailbox. It costs $9.95 a year, and two features make it well worth the price: a list of bulletin boards across the country (updated quarterly), and—best of all—information and "help" menus from many different systems. I always felt like I was stealing too much time from somebody else's bulletin board while I groped through the menus, but along came this publication. Write to J.A. Cambron Co. Inc., P.O. Box 10005, Kansas City, MO 64111-9990.

The Model I voice input/output installation (January Applications) contains a minor error. The correct trace to cut on the CPU board goes from pin 10 of Z4 to pin 9 of Z24. The orange wire also goes to pin 10 of Z4. The diagram was incorrectly marked Z4 pin 9, although it showed the correct trace. Thanks to many readers including M. Pollard of Soquel, California, for picking that up very quickly.

In the same article, the software had a small error, which does not affect its operation unless the voice input routines are used with other software. Line 500 (LD A,C) should appear after line 530. That resets port 255 correctly for 32-character mode.

Another small error crept into the Color Computer keyboard addition project (also January Applications). The keyboard wiring diagram omits a connection between the bottom pin on "H" to the bottom pin on "8". If you aren't getting your H or X keys, that's why. Both the photograph and the keyboard matrix are correct. A revised section of the diagram is shown below:

Brian Welch of Virginia Beach, Virginia, called to say that initially he had problems with the Model I destreakifyer modification (February). He traced the difficulty to a bad 2102 memory chip in his original circuit board. Because some fast switching is going on in this modification, marginal 2102 chips may produce "stuck" characters. Brian was the only reader who identified this problem, so it's probably an unlikely one.

Thanks to the many readers who wrote in with the solution to my request for a simple way to reseed the Color Computer's random number sequence. Shortly after I wrote the article, the information turned up in both *80 Micro* and *TRS-80 Microcomputing News*. The solution is to request a negative random number using an indeterminate base. The suggested process is very simple: X = RND (-TIMER) at the beginning of a program.

New fonts are available for the Color Computer Lowerkit (November Applications). These include Greek, Math Symbols, APL and Kata Kana. Hebrew, Arabic, and Cyrillic are in preparation as I am writing (February). Write to MSB Electronics, Drawer 766, Barre, VT 05641.

There is an inconsistency in the twisted-pair modification for early Model I expansion boxes (Exclusive Oracle, September). This modification works as presented for a single system. However, if you wish to switch expansion boxes or use your keyboard on other systems, you should know that Radio Shack uses the red/black wire for RAS, blue (or green)/black for CAS, and white/black for MUX.

Model I interrupts not working? Not sure? Try this one liner as a test from Level II. It will produce a continuous display:

```
10 A = 16402:POKEA,195:POKEA + 1,2:POKEA + 2,80:
FORX = 20480TO20509:READA:POKEX,A:NEXT:
POKE16526,0:POKE16527,80:M = USR(0):
DATA251,201,243,245,229,213,197,58,238,55,58,224,55,
33,17,1,17,38,60,1,26,0,237,176,193,209,225,241,251,201
```

Model I disk drives selecting incorrectly? Not sure? Try this one liner. It will select them in order:

```
10 X = 14304:POKEX,1:FORN = 1TO200:NEXT:POKEX,
2:FORN = 1TO200:NEXT:POKEX,4:FORN = 1TO200:
NEXT:POKEX,8:FORN = 1TO200:NEXT:GOTO10
```

Color Computer doesn't always turn on, or turns itself off in mid-program? Two resistors and two transistors handle a significant part of the 5-volt supply, and I've seen a couple units where the factory sol-

dering was unsatisfactory. Resolder all connections to R59, R66, Q2 (two are on the bottom of the board, as are the screw heads which should also be soldered) and Q3, and your power should be reliable once more.

The first Flex operating system for the Color Computer is here. I've been chomping at the proverbial bit for months to mention details, but the author of the system patches and documentation (Steve Odneal of Kansas City) has held me back. So now you can write to Data-Comp, South East Media, P.O. Box 794, Chattanooga, TN 37443 for details. The price of the basic Flex package is $150, with patches to the Exatron or Radio Shack operating systems priced at $49.95. If you are already a Flex owner, the patch system and documentation is $59.95 separately. It contains an Editor/Macro Assembler and full Flex utilities, and runs in a 64K RAM system and requires the 1.1 Basic ROM. Steve reports that a replacement 1.1 ROM can be obtained from Radio Shack National Parts distribution system for $36.30 with exchange of your old ROM. He also says that a very minor hardware modification is necessary to access all of the 64K RAM for standard Flex use—both banks of which have been working in later units, he reports. 32K Flex also works just fine. Good for Steve and the fine operating system, and good for Radio Shack for supplying those top quality memories.

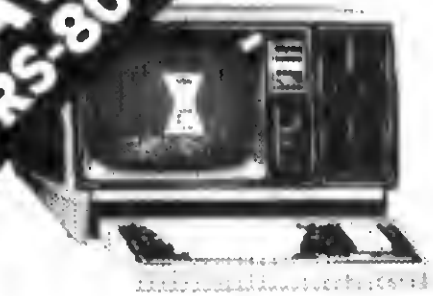
If you have been following this column for the past two years, you know I purchased my early TRS-80 seeking to discover techniques of digital technology which might be useful in the preparation and performance of my music. The path was long and difficult for a composer with no previous knowledge of computer languages or digital electronics, and I allowed myself four years to achieve an understanding of those techniques. These are at last within my grasp, right on schedule.

That means that "80 Applications" will be going bimonthly, alternating with the "Exclusive Oracle." Occasionally but rarely I hope to contribute other meaningful ideas to the pages of *80 Micro*, and the editors have stashed away one or two of my articles for sometime later this year. However, aside from these miscellany, I am significantly reducing my presence in the world of personal computing. My thanks go to all those who heve offered suggestions, ideas, improvements, and criticisms; without them these columns would truly have been an impossible task, since very little in my work is dramatically original.

By the time you read this, I will have returned primarily to musical composition, to its rewards, to its frustrations, and to its inevitable and unhappy anonymity in twentieth-century America.

We all have our teachers. Mine was Philip K. Hooper, much of whose thought guided the writing of these columns. I've mentioned Dr. Hooper's work often, as he was the inspiration for the economies in both my software and hardware. He abhorred excessive, affected software, liked minimal programming and operating systems, and loved challenges. He was the first—and probably the only—programmer to implement six-level multitasking on a KIM-1 computer with only 1K of memory. He founded the mythical Edible Bytes Corporation and worked under the appropriate title, The Codesmith. Phil, one of my closest friends, died in February. ■

SAVE TRS-80's



TRS-80™'s and Hewlett-Packard

85, 87 & 125 Computers

Best Discounts Possible

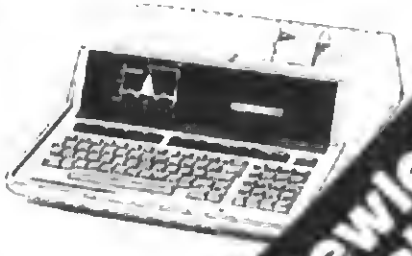
WE PAY SHIPPING in the 48 continental states on prepaid orders of $100.00 or more
NO TAXES are collected on out-of-state shipments.
WE ACCEPT Visa, MasterCard and American Express, or you can save additional money by paying cash.

Pan American Electronics

TOLL FREE ORDER NUMBER 800/531-7466

1117 Conway • Dept. 36 • Mission, Texas 78572
Phone 512/581-2766 • Telex Number 767339

FORT WORTH BRANCH
2912 N. Main • Dept. 36 • Ft. Worth, Texas 76106
Phone 817/625-6333 • Telex Number 794836



VISA MasterCard

Hewlett-Packard

TM Trademark of Tandy Corporation

See List of Advertisers on page 338

80 CALENDAR

August

1-4 Nevada-Reno Division of Continuing Education and Washoe County School District. **Microcomputer Applications in Education** Cloud's Cal-Neva, Lake Tahoe, NV.

3 Motorola Inc., Phoenix, AZ. **Seminar on 8-bit MPUs** Regency Hotel, Denver, CO.

4 Motorola Inc., Phoenix, AZ. **Seminar on 8-bit MPUs** Airport Hilton, Salt Lake City, UT.

10-11 The Yankee Group, Cambridge, MA. **AT&T: The Uncommon Carrier** New York, NY.

10-11 The Yankee Group, Cambridge, MA. **The Future of the Communications Industry** New York, NY.

12-13 Vocational Studies Center, University of Wisconsin-Madison. **Microcomputers in Vocational Education conference** Sheraton Inn, Madison, WI.

17 Motorola Inc., Phoenix, AZ. **Seminar on 8-bit MPUs** Henry VIII Inn and Lodge, St. Louis, MO.

17-18 The Yankee Group, Cambridge, MA. **AT&T: The Uncommon Carrier** Palo Alto, CA.

17-18 The Yankee Group, Cambridge, MA. **The Future of the Communications Industry** Palo Alto, CA.

18 Motorola Inc., Phoenix, AZ. **Seminar on 8-bit MPUs** Roadway Inn, Columbus, OH.

19 Motorola Inc., Phoenix, AZ. **Seminar on 8-bit MPUs** Howard Johnson's, Richmond, VA.

20 Motorola Inc., Phoenix, AZ. **Seminar on 8-bit MPUs** Ramada Inn, Overland Park, KS.

September

5-9 The European Association for Microprocessing and Microprogramming, Paris. **Euromicro '82** Haifa, Israel.

7-10 Management Science America, Inc., Atlanta, GA. **Interact I: A Convention Users of Cash Management Systems** Atlanta Hyatt Regency Hotel.

9-12 Personal Computer World, London, UK. **Fifth Personal Computer World Show** Barbican Center, London, UK.

11-12 Kengore Corporation, Franklin Park, NJ. **New Jersey Microcomputer Show and Flaamarkat** Holiday Inn, North Passenger Terminal, Newark International Airport.

13 Motorola Inc., Phoenix, AZ. **Seminar on 8-bit MPUs** Motorola Headquarters, Schaumburg, IL.

14 Motorola Inc., Phoenix, AZ. **Seminar on 8-bit MPUs** Harley Hotel, Independence, OH.

16 Motorola Inc., Phoenix, AZ. **Seminar on 8-bit MPUs** Preston Wood Country Club, Dallas, TX.

17 Motorola Inc., Phoenix, AZ. **Seminar on 8-bit MPUs** Fiesta Inn, Tempe, AZ.

21-24 Integrated Computer Systems, Santa Monica, CA. **Computer Graphics Course** Washington, DC.

23 Motorola Inc., Phoenix, AZ. **Seminar on 8-bit MPUs** Hilton Westchese, Houston, TX.

28 Motorola Inc., Phoenix AZ. **Seminar on 8-bit MPUs** Sheraton Inn, Rochester, NY.

29 Motorola Inc., Phoenix, AZ. **Seminar on 8-bit MPUs** Hilton Inn, North Syracuse, NY.

30 Motorola Inc., Phoenix, AZ. **Seminar on 8-bit MPUs** Howard Johnson's, Monroeville, PA.

October

1 Motorola Inc., Phoenix, AZ. **Seminar on 8-bit MPUs** Holiday Inn East, Wichita, KS.

1-3 Philadelphia Area Computer Society, Philadelphia, PA. **Philadelphia Area Computer Show** Philadelphia Center Hotel.

8-11 Northeast Expositions Inc., Chestnut Hill, MA. **Electronics: Personal Electronics and Home Entertainment Products** Hynes Auditorium, Boston, MA.

19 Motorola Inc., Phoenix, AZ. **Seminar on 8-bit MPUs** Holiday Inn, Ft. Washington, PA.

20 Motorola Inc., Phoenix, AZ. **Seminar on 8-bit MPUs** Stratford Inn, Stratford, CT.

21 Motorola Inc., Phoenix, AZ. **Seminar on 8-bit MPUs** Sheraton Smithtown Inn, Smithtown, NY.

22 Motorola Inc., Phoenix, AZ. **Seminar on 8-bit MPUs** Sheraton-Lexington Motor Inn, Lexington, MA.

24-26 Texas Association for Educational Data Systems, Austin, TX. **18th Annual Convention** Villa Capri Hotel, Austin, TX.

25-27 Association for Computing Machinery, New York, NY. **Annual Convention** Dallas Hilton Hotel.

30-2 The George Washington University, Office of Continuing Medical Education, Washington, DC. **Symposium on Computer Applications in Medical Care** Sheraton Washington Hotel, Washington, DC.

Coming Next Month

Are you in the market for a word processor program? To help you make your choice, Dan Robinson will review many of the popular word processors available for the Models I and III, and Paul Grupp will review those available for the Model II. To make your word processing even more productive, we'll also feature reviews of several spelling checkers on the market.

If you already have Scripsit, but it doesn't quite fill the bill, we'll feature several Scripsit enhancement and modification programs. ■

PROGRAMMING TOOLS FOR YOUR TRS-80™ MODEL I AND MODEL III

INSIDE LEVEL II

The Programmers Guide to the TRS-80 ROMS

INSIDE LEVEL II is a comprehensive reference guide to the Model I and Model III ROMs which allows the machine language or Basic programmer to easily utilize the sophisticated routines they contain. Concisely explains set-ups, calling sequences, and variable passage for number conversion, arithmetic operations, and mathematical functions, as well as keyboard, tape, and video routines. Part II presents an entirely new composite program structure which loads under the SYSTEM command and executes in both Basic and machine code with the speed and efficiency of a compiler. In addition, the 16 chapters include a large body of other information useful to the programmer including tape formats, RAM useage, relocation of Basic programs, USR call expansion, creating SYSTEM tapes of your own programs, interfacing of Basic variables directly with machine code, and special precautions for disk systems. INSIDE LEVEL II is a clearly organized reference manual. 80 Microcomputing calls it "a volume of valuable information...immensely thoughtful, literate, and cleanly designed." Byte Magazine says: "I recommend this book to serious machine language programmers."
Includes updates for Model III. INSIDE LEVEL II.....$15.95

SINGLE STEP THROUGH RAM OR ROM

STEP80 allows you to step through any Basic or machine language program one instruction at a time, and see the address, hexadecimal value, Zilog mnemonic, register contents, and step count for each instruction. The top 14 lines of the video screen are left unaltered so that the 'target program' may perform its display functions unobstructed. STEP80 will follow program flow right into the ROMs, and is an invaluable aid in learning how the ROM routines function. Commands include step (trace), disassemble, run in step mode at variable step rate, display or alter memory or CPU registers, jump to memory location, execute a CALL, set breakpoints in RAM or ROM, write SYSTEM tapes, and relocate to any page in RAM. The display may also be routed to your line printer through the device control block so custom print drivers are automatically supported.
Specify Model I or Model III. STEP80.....$16.95

SMART TERMINAL PROGRAM

This machine language program may be used as a smart terminal with time share systems or for high speed file transfers between two disk-based micros over modems or direct wire. It is menu driven and extremely simple to use. Functions include real-time terminal mode, save RAM buffer on disk, transmit disk file, receive binary files, examine and modify UART parameters, program 8 custom log-on messages, automatic 16-bit checksum verification of accurate transmission and reception, and many more user conveniences. Supports line printers and lowercase characters. With this program you will no longer need to convert machine language programs to ASCII for transmission, and you will know immediately if the transmission was accurate. This program comes on a formatted disk.
Specify Model I or Model III. TELCOM.....$36.95

PROGRAM INDEX VERSION 2.0

Assemble an alphabetized index of your entire program library from disk directories. Program names and free space are read automatically (need not be typed in) and may be alphabetized by disk or program. The list may also be searched for any disk, program, or extension; disks or programs added or deleted; and the whole list or any part sent to the printer. Printer output may be requested in three different formats including labels. The list itself may also be stored on disk for future access and update. It also includes a PURGE mode for quickly killing unwanted files. Directory reads and alphabetizing is done in machine code for speed. 1,000 programs may be sorted in less than 10 seconds. 80 Microcomputing called it "The best thing since sliced bread." It works with TRSDOS, OS-80, NEWDOS, and NEWDOS/80 single or double density. One drive and 32K required.
Specify Model I or Model III. INDEX.....$24.95

4 SPEED OPTIONS FOR YOUR TRS-80

The SK-2 clock modification allows CPU speeds to be switched between normal, an increase of 50%, or a 50% reduction; selectable at any time without interrupting execution or crashing the program. Instructions are also given for a 100% increase to 3.54 MHz. The SK-2 may be configured by the user to change speed with a toggle switch or on software command. It will automatically return to normal speed any time a disk is active, requires no change to the operating system, and has provisions for adding an LED to indicate when the computer is not at normal speed. It mounts inside the keyboard unit with only 4 necessary connections for the switch option (switch not included), and is easily removed if the computer ever needs service. The SK-2 comes fully assembled with socketed IC's and illustrated instructions.
Model I only. SK-2.....$24.95

INSTANT ASSEMBLER NOW ON DISK!

The INSTANT ASSEMBLER is a powerful disk or tape-based assembler and debugger for the TRS-80. Now you can assemble directly o memory and immediately debug your program with the built in single stepping debugger. Quickly switch from assembler to debugger and back again without losing the source code. This feature makes INSTANT ASSEMBLER an excellent learning tool for assembly language programming.
INSTANT ASSEMBLER is absolutely unique among tape based assemblers in that it produces relocatable code modules that can be linked with the separate LINKING LOADER, which is supplied in two versions for loading programs into either high or low RAM. This lets you build long programs with small modules. INSTANT ASSEMBLER also features immediate detection of errors as the source code is entered, a compactly coded source format that uses 1/3 as much memory as standard source, and many operational features including single stroke entry of DEFB and DEFW, pinpoint control of listings, alphabetic listing of symbol table, separate commands for listing error lines or the symbol table, block move function, and verification of source tapes.
INSTANT ASSEMBLER's debugger provides single stepping with full register displays, decimal or hex entry of addresses, forward or backward memory displays, disassembly of object code in memory, memory display in ASCII format, and hex-to-decimal or decimal-to-hex conversion. The single-stepper will step one instruction at a time or at a fast rate to any defined address.
INSTANT ASSEMBLER occupies less than 8400 bytes of memory. In a 16K machine this will leave you enough memory to write assembly language programs of around 2000 bytes. This and its module-linking feature make INSTANT ASSEMBLER ideal for users with only 16K machines. The instruction manual may be purchased separately for $3, which will apply towards the purchase of the INSTANT ASSEMBLER. In addition to disk I/O, the disk version includes a stand-alone version of the debugger.
Specify Model I or Model III. TAPE INTASM.....$29.95
Specify Model I or Model III. DISK INTASM.....$35.95

RESTORE DAMAGED TAPES WITH RESQ2

Cassette recordings are subject to several types of damage. Thin spots in the oxide, dirt, voltage fluctuations while recording, or stray magnetic fields can all contribute to lost or added bits. RESQ2 was written to provide a method of restoring tapes that can no longer be loaded for these reasons. It can restore BASIC, SYSTEM, ASSEMBLER, and DATA tapes. RESQ2 compares two copies of the damaged tape to attempt a restoration, though restoration can often be accomplished with only one copy. After the damaged data is corrected in memory, a new tape may be recorded and verified which does not contain the errors. The success rate of RESQ2 will depend on the severity and quantity of errors. RESQ2 comes with a comprehensive user manual and examples of two types of 'crashed' programs to practice on.
Specify Model I or Model III. RESQ2.....$19.95

RAM SPOOLER AND PRINT FORMATTER

This program is a full feature print formatting package featuring user defineable line and page length (with line feeds inserted between words or after punctuation), screen dump, printer pause control, and baud rate selection. In addition, printing is done from a 4K expandable buffer area so that the LPRINT or LLIST command returns control to the user while printing is being done. Works with cassette or disk systems. Ideal for Selectric or other slow printers. Allows printing and processing to run concurrently. Output may be directed to either the parallel port, serial port, or the video screen. 80 Microcomputing said "I can only give my highest recommendation of Spooler and Mumford Micro Systems."
Specify Model I or Model III. SPOOLER.....$16.95

DUPLICATE SYSTEM TAPES WITH CLONE

Make duplicate copies of almost any tape including Basic, SYSTEM, data lists, assembler source, or 'custom loaders'. The file name, load address, entry point, and every byte (in ASCII format) are displayed on the video screen. Model III version allows changing tape speed so you can load in a tape at 500 baud and write it out at 1500.
Specify Model I or Model III. CLONE.....$16.95

MACHINE CODE FAST FOURIER TRANSFORM

Written by Dr. A H. Gray, Jr., co-author (with J.D. Markal) of the classic text 'Linear Prediction of Speech', this complete package includes 3 versions of the machine language FFTASM routine assembled for 16, 32, and 48K machines, a short sample Basic program to access them, a 10K Basic program which includes sophisticated interactive graphing and data manipulation, and a manual of instructions and examples. The machine language subroutines use variables defined by a supporting Basic program to make data entry and retrieval automatic, without PEEKs and POKEs. They perform 20 to 40 times faster than their Basic equivalent (256 points in 12.5 seconds), and handle up to a 1024 point complex FFT. The FFT is useful in analyzing stock market and comodity trends as well as for signal analysis.
Specify Model I or Model III. FFTASM.....$49.95
FFTASM on disk with source code.....$99.95

MUMFORD MICRO SYSTEMS

ORDERING: [illegible] except TEL[illegible]M [illegible]1 INTASM [illegible] shipped [illegible] cassette unless $5 is indic[illegible] Disk formatted [illegible] system; disk [illegible] $5 for postage and handling. C.O.D. [illegible] Visa, Mastercharge and [illegible] SPECIFY MODEL I OR MODEL III [illegible] quotes invited.

Box 400-E Summerland, California 93067 (805) 969-4557

See List of Advertisers on page 338

Copernica Mathematica

by Bruce Douglass

"Few people are used to thinking in spatial terms."

This month we will discuss a different type of topic—spatially-oriented puzzles. The best known spatially-oriented puzzle is Fifteen, created by Sam Lloyd many years ago. A more popular one these days was invented in 1975 by a Hungarian mathematician with the name of Rubik. His puzzle is the infamous Rubik's Cube.

I wish to introduce three new puzzles that are based primarily on the Rubik's cube, but these are two-dimensional rather than three. They will be called Bruce's Squares.

Square One

All three puzzles are based on a large square made up of three smaller ones on each side (for a total of nine small squares in each large square). This is graphically depicted in Fig. 1.

The goal for all the problems is the same—to rearrange the small squares into a specific order. Allowable moves differ, depending on which game you are using.

Square One (Program Listing 1) allows only rotational moves of intermediate-sized squares. In Fig. 1 the smallest squares are labeled A through I, from left to right and from top to bottom. This is the goal state of the problem. The intermediate squares are made up of four small squares. Thus, one intermediate square in Fig. 1 would consist of small squares A,B,D,E; another would be B,C,E,F. The intermediate squares are labeled 1,2,3,4. Whenever I refer to a numbered square in this game, I will be speaking of an intermediate block; a lettered square will be a small block. Square 1 would consist of small squares A,B,D,E; square 2 would consist of small squares B,C,E,F; square 3 would be D,E,G,H; and square 4 would be E,F,H,I.

The legal moves in the first game are rotations (left or right) of an intermediate square. The game requires that you enter the square number to be moved, and then the rotation direction. L (left) is the same as counterclockwise, and R (right) is the same as clockwise.

The game randomly mixes the small squares and then displays the current orientation. It will also display the number of moves that you have made, and ask you for your next move. After you enter a move, the program will evaluate it and determine if the move is legal. If so, the program will make the move and determine whether you are at the goal state. If not, it will display the move, increment the number of moves by one and query you again. To give up, enter 9,C.

This is not as simple a problem as it first appears. Few people are used to thinking in abstract spatial terms. For example, suppose you have the situation in Fig. 2. How do you move the A into the upper left corner of the large square? Well, since it is at the lower right corner, you would have to enter the following short sequence of commands:

- 4, L—rotate counterclockwise medium square 4
- 4, L—repeat so A is also part of medium square 1
- 1, R—rotate square 1 clockwise
- 1, R—repeat so A is in the proper place.

Of course, if the overall problem was this simple, it would not be an interesting game at all! Suppose in Fig. 3 that we wish to orient A, B and C. How can we do that? The following seven-move sequence will do it:

- 4, R—produces Fig. 4
- 3, L—produces Fig. 5

Program Listing 1

```
10 CLS:PRINT"BACK TO SQUARE 1 - BY BRUCE POWEL DOUGLASS"
15 PRINT:PRINT"TO PLAY, YOU WILL BE SHOWN A SQUARE WITH"
20 PRINT"A NUMBER OF SMALLER SQUARES.  THE OBJECT IS TO"
25 PRINT"GET THE SQUARES IN LEFT - RIGHT ALPHABETICAL ORDER"
30 PRINT"YOU DO THIS BY ROTATING INNER SQUARES, EACH OF"
35 PRINT"WHICH CONTAIN 4 SQUARES. THESE MEDIUM-SIZED SQUARES"
40 PRINT"ARE INDICATED BY THE NUMBERS 1, 2, 3, OR 4."
45 PRINT"SQUARE 1 CONSISTS OF THE SMALL SQUARES 1, 2, 4, AND 5"
50 PRINT"AND SQUARE 2 CONSISTS OF SMALL SQUARES 2,3,5,6."
55 PRINT"SQUARE 3 CONSISTS OF SMALL SQUARES 4,5,6,7 AND"
60 PRINT"SQUARE 4 CONTAINS #'S 5,6,8,9"
65 INPUT"CONTINUE";A$
70 CLS:PRINT"YOU MAY ROTATE THE SQUARES CLOCKWISE (R) OR"
75 PRINT"COUNTER-CLOCKWISE (L): THE POSITIONS OF THE SQUARES"
80 PRINT"ARE ADJUSTED.  TO CONCEDE, ENTER 9,C. THE PROGRAM"
85 PRINT"WILL TELL YOU WHEN YOU WIN AND THE NUMBER OF MOVES"
90 PRINT"THAT IT TOOK - PRESS <ENTER> TO START"
```

Program Listing 1 Continues

A	B	C
D	E	F
G	H	I

Figure 1

- 1, R—produces Fig. 6
- 4, L—produces Fig. 7
- 4, L—produces Fig. 8
- 2, L—produces Fig. 9
- 1, R—produces Fig. 10

Of course, the ultimate goal is to put all the little squares in their rightful homes. To do this, it is most effective to think in terms of spatial transformations. The first example pointed to a simple type of two-dimensional rotational transformation. We achieved a diagonal linear transformation by using four rotational ones; that is, we moved the A square from the lower right corner to the upper left corner (a diagonal move) by rotating square 4 twice and then square 1 twice.

The transformation achieved in the second example is a bit more complex, but it is still easily thought of as a sum of several rotational transformations.

The basic goal is to travel from the initial state (Fig. 3) to the final state (Fig. 10). The conceptual process I went through divided the ultimate goal into two stages (although there are many other ways to achieve the same effect). First, I wanted to align A and B so I could rotate them in with a single move. I wanted to move C separately. Figure 6 came to mind as an intermediate goal state; from there I could easily solve the problem.

So the problem is divided into two pieces: how to achieve Fig. 6 and how to achieve Fig. 10 from Fig. 6. The first part required only three moves. The second part was easier conceptually, although it used four moves.

It is often easier to break up the main problem into subgoals and solve the subgoals one at a time. Thinking in spatial terms, though difficult at first, becomes easier with practice.

Square Two

The second game (Program Listing 2) uses only linear-spatial transformations. That is, you may only move squares in a straight line. In Fig. 11 you may move A two ways: horizontally or vertically. Both orientations have two directions. You can move A left or right horizontally, or up or

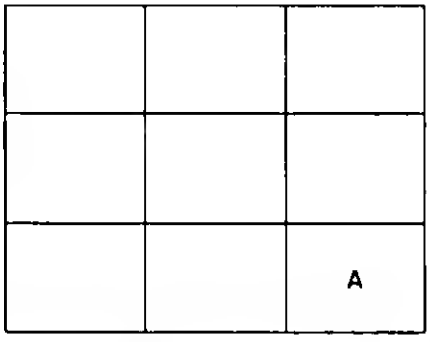


Figure 2

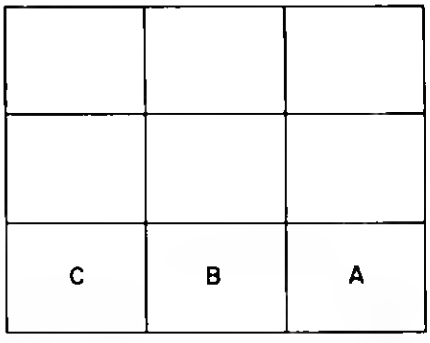


Figure 3

NEW from

Synware Games

Hypergate

Series

UNDENIABLY THE BEST SCIFI
Others only dream of such programming, we make it a reality!

HYPERGATE CENTURION - A totally original "Real Time" simulation overflowing with superb action sound & graphics. A 100% machine code masterpiece with **everything** you wanted in a SciFi game: space monsters, marauding pirates, military skirmishes, your own fleet of patrol ships, dazzling explosions, startling graphics, multiple skill levels, and much, much more. (16K System tape)

HYPERGATE PATROL - A fantastic spinoff from Hypergate Centurion with excellent sound & graphics. Command a hypergate patrol ship and navigate the Hypergates of the Local Super Cluster in search of danger. (16K Basic tape step action strategy)

Both games on one cassette

$39.95

Ask your dealer for **Synware Games**, or order from us. The games are compatible with the TRS-80 model I or III. Specify 16K Level II compatible versions or 32K Disk compatible versions on cassette (user transfers from cassette to disk).

Postage paid in USA & Canada. Foreign orders add $2.00 for postage. COD orders $3.00 extra. Florida residents add 4% sales tax.

Send check or money order to:
Synergistic Solar, Inc.
P. O. Box 560695
Miami, Florida 33156

We have a full line of top notch games. For free catalog mail us a postcard or letter.

DEALER INQUIRIES MOST WELCOMED

TRS-80 is a trademark of Tandy Corp.

Program Listing 1 Continued

```
 95 IF INKEY$="" THEN 95 ELSE CLS:PRINT@535,"JUST A SEC .....";
100 CLEAR 200:DEFSTRA-D:DEFINTI-K
110 K(1)=1:K(2)=2:K(3)=4:K(4)=5
120 A="  ":B=CHR$(191):C=CHR$(131):D=CHR$(176)
130 A1=B+STRING$(5,C)+B
140 A3=B+STRING$(5,D)+B
150 FOR I=1 TO 9
160   J=RND(9):FOR K=1TOI:IF J=J(K) THEN 160 ELSE NEXT K
170 J(I)=J
180   A(I)=B+A+CHR$(J+64)+A+B:J=J+1
190 NEXT I
200 CLS:PRINTCHR$(23);
210 FOR I=1 TO 9:
220 J=1
230 PRINT A1;A;A1;A;A1
240 FOR I=J TO J+2
25B   PRINT A(I);A;
260 NEXT I:PRINT
270 PRINT A3;A;A3;A;A3:PRINT
280 J=J+3:IF J>9 THEN 290 ELSE 230
290 K(0)=64:K(1)=320:K(2)=576:PRINT@974,"MOVE ";K9;
360 PRINT@896,"";:INPUT"ENTER SQUARE, AND ROTATION";J,A9
365 IF J=9 AND A9="C" THEN 520
370 IF J>4 OR J<1 THEN 360 ELSE J=K(J) 'STARTING OF SOR
380 IF A9<>"R" TBEN IF   A9<>"L" THEN 360
390 REM OK, NOW ROTATE THE SQUARES
400 REM K(J) CONTAINS THE POSITIONS FOR ROTATIONS
410 IF A9="L" TBEM 440
420 A4=A(J):A(J)=A(J+3):A(J+3)=A(J+4):A(J+4)=A(J+1):A(J+1)=A4
430 GOTO 450
440 A4=A(J):A(J)=A(J+1):A(J+1)=A(J+4):A(J+4)=A(J+3):A(J+3)=A4
450 REM NOW TEST TO SEE IF EVERYTHING IS CORRECT
460 FOR I=1 TO 9:A5=MID$(A(I),4,1):IF A5<>CHR$(I+64) THEN 500
470 REM DISK PEOPLE USE "FOR I=1TO9:IF INSTR(A(I),CHR$(I+64))=0
THEN 300
480 NEXT I:PRINT@896,"DONE!! AND IN ONLY ";K9;" MOVES!"
490 INPUT"AGAIN";A9:IF A9="Y" OR "YES" THEN 100 ELSE END
500 REM NOT DONE YET!
510 K9=K9+1:GOTO 200 ' REDRAW SCREEN
520 PRINT@896,"QUITTER!! YOU TOOK ";K9;"MOVES      ";:END
560 NEXT I:PRINT@896,"DONE!! AND IN ONLY ";K9;" MOVES!"
570 INPUT"AGAIN";A9:IF A9="Y" OR A9$="YES" THEN 150 ELSE END
580 REM NOT DONE YET!
590 K9=K9+1:GOTO 260 ' REDRAW SCREEN
600 PRINT@896,"QUITTER!! YOU TOOK ";K9;"MOVES      ";:END
```

Program Listing 2

```
10 CLS:PRINT"   ON TO SQUARE 2 - BY BRUCE POWEL DOUGLASS"
20 PRINT:PRINT"TO PLAY, YOU WILL BE SHOWN A SQUARE WITH"
30 PRINT"A NUMBER OF SMALLER SQUARES.  THE OBJECT IS TO"
40 PRINT"GET THE SQUARES IN LEFT - RIGHT ALPHABETICAL ORDER"
50 PRINT"YOU DO THIS BY SHIFTING THE ROWS LEFT OR RIGHT"
60 PRINT"OR THE COLUMNS UP OR DOWN.  THIS SHIFT IS REALLY A"
70 PRINT"ROTATE, SINCE THE SQUARE THAT LEAVES THE BLOCKS WILL"
80 PRINT"REAPPEAR AT THE OTHER END OF THE ROW OR COLUMN."
90 PRINT"THE ROWS AND COLUMNS ARE BOTH NUMBERED 1 - 3"
100 PRINT"AND THE PROGRAM TELLS WHICH YOU MEAN BY THE PRESENCE"
110 PRINT"OF A ROW COMMAND (R OR L), OR A COLUMN COMMAND (U OR D
)"
120 PRINT"TO CONCEDE, ENTER 9,C. THE PROGRAM"
130 PRINT"WILL TELL YOU WHEN YOU WIN AND THE NUMBER OF MOVES"
140 PRINT"THAT IT TOOK - PRESS <ENTER> TO START"
150 IF INKEY$="" THEN 150 ELSE CLS:PRINT@535,"JUST A SEC .....";

160 CLEAR 200:DEFSTRA-D:DEFINTI-K
170 K(1)=1:K(2)=4:K(3)=7
180 A="  ":B=CHR$(191):C=CHR$(131):D=CHR$(176)
190 A1=B+STRING$(5,C)+B
200 A3=B+STRING$(5,D)+B
210 FOR I=1 TO 9
220   J=RND(9):FOR K=1TOI:IF J=J(K) THEN 220 ELSE NEXT K
```

Program Listing 2 Continues

down vertically. If you move A across to the right, it will move into the middle square of the top row. If you move it left, it disappears off the left side and reappears at the top right corner. Alternately, if you move A down, it becomes the first square of the middle row; if you move it up, it becomes the first piece in the last row.

Specify moves by entering a row or column number (one is the top row or first column and three is the bottom row or last column), followed by a row or column direction (R,L,U and D stand for right, left, up and down). To move row 3 right one square, enter 3, R. To move column 2 down one square enter 2,D.

	B	
C	A	

Figure 4

B	A	
	C	

Figure 5

B		
A		
	C	

Figure 6

You've Got TOTAL ACCESS ©

(Specializing in TRS80 & IBM)

TO YOUR COMPUTER HARDWARE & SOFTWARE NEEDS. CALL ROSE TODAY!

Rose ©

The complete line of Radio Shack products is available through TA with standard RS limited warranty. Call me for price and delivery. Just cause you don't see it don't mean we ain't got it.
ROSE

Iv'e got

★ **DISK DRIVES**
- TA400 (40-T)..... $289
- TA800 (80-T)..... $399
- TA400 Flippy..... $319
- TA800 Flippy..... $409
- TA400-2 Dual Head..... $409
- TA800-2 Dual Head..... $549

Complete with silver enclosure & power supply. All TA Drives are MPI.

★ **CABLES**
- 2-Drive..... $23.95
- 4-Drive..... $33.95
- Extender Cable..... $14.95

★ **BARE DRIVES**
- TA400B..... $249
- TA800B..... $349
- TA400B Flippy..... $269
- TA800B Flippy..... $359

★ **EPSON PRINTERS**
- MX80..... $469.00
- MX80 F/T..... $579.00
- MX100..... $769.00
- Parallel Cables..... $9.95‡
- MX 70-80 Ribbons..... $9.95

★ **OPERATING SYSTEMS**
- TRSDOS 2.3 Disk & Manual....$19.95
- LDOS..... $119.95
- NEWDDS/80..... $129.95
- DOSPLUS 3.3,3.3D..... 589.95

★ **IRON**
- Disk Drive Power Supply, Single..... 537
- Disk Drive Case (silver)and Base $19
- Diskettes (box of 10)..... $25

90 day warranty on **DRIVES.** Add $5.00 freight per drive in Cont. U.S. UPS COD charge $1.50. There is also a 15 day FREE TRIAL on TA drives. If not completely satisfied I'll refund your money (less shipping). I'll take exception to improper use or mishandling.

★ **RADIO SHACK COMPUTERS**
- 26-1061 MIII, LI, 4K..... $595
- 26-1062 MIII, LII, 16K..... $835
- 26-1065 MIII, 48K, 1 Drive..... $1695
- 26-1066 MIII, 48K-2 Dr-R5232..$2099
- 26-3001 4K Color Computer...$315
- 26-3002 16K w/ext. Basic..... $485
- 26-3003 32K w/ext. Basic..... $566
- 26-3501 Pocket Computer....$185
- 26-4002 MII, 64K, 1-dr..... $3288

★ **PERIPHERALS - Model I, II, III**
- 26-1140 OK Exp. Interface..... $299
- 26-1140 With 16K Mem. Tstd/ 5349
- 26-1140 With 32K Mem. Tstd/ $375
- 26-1145 MI R5232 w/cable..... $85
- 26-1148 MIII RS232 w/cable..... $89
- 26-6001 M16,128K,1DR..... $4399
- 26-6002 M16,128K,2DR..... $5099
- 26-1172 D.C. Modem I..... $135
- 26-1173 D.C. Modem II..... $199
- 26-1206 CTR-80 Recorder..... $51
- 26-3008 CC Joysticks, pr..... $21
- 26-3010 13" Color Video..... $353
- 26-4150 MII 8.4MB Disk..... $3820
- 26-4151 MII Hard Disk NO.2...$2970
- 16K 200nsec Memory Guar 1yr. $29

★ **OTHER PRINTERS & ACCESSORIES**
- 26-1158 Daisy Wheel II..... $1694
- 26-1455 Acoustic Cover..... $339
- 26-1447 Tractor Assy..... $208
- 26-1448 Sheet Feeder..... $1111
- 26-1165 Line Printer V..... $1581
- 26-1166 Line Printer VI..... $986
- 26-1167 Line Printer VII..... $339
- 26-1168 Line Printer VIII..... $679
- 26-1191 Flat Bed Plotter..... $1695
- 26-1195 Digitizer..... $379
- ANADEX DP-9500, 9501..... $1295
- Starwriter F10 Daisywheel $1499
- Daisy Wheel Printer, 45cps...$1779
- Tractor for above..... $237
- Sheet Feeder for above..... $1250
- 26-1308 Printer Stand..... $88
- 26-4302 Printer Stand..... $129
- 26-1401 or 4401 Printer Cable..$32

HOT PRICES-CALL!!

ROSE GOES IBM

ALL NEW DISK DRIVES FOR IBM PERSONAL COMPUTER

INTERNAL & EXTERNAL ADD-ON DRIVES "FLIPPY"* or STD. 40-track

★ **A&B INTERNAL DRIVES** (First & Second)
Standard..... $249ea. (List 569.99)
Flippy..... $269ea (Not available from IBM)

Purchase your IBM PC without drives but with the disk drive controller/adapter & cable and the Disk Operating System (DOS) and **SAVE A BUNCH!**

★ **C&D External Drives** (Third & fourth)
Standard..... $289ea
"Flippy"..... $319ea
complete with matching case & power supply

★ **2 External Drive Cable $23.95**

*"Flippy" allows flipping the diskette over & reading/writing to the back side. Cuts diskette cost in half. No special diskette required.

ZENITH MONITORS

12" Screen * Green Phosphor
This is the one you have been waiting for. Well built. Works great with the model I. Also has 40/80 column switch so the Apple folks can use it. 90 day warranty good Nationwide. Sell your old Model I monitor and be the first on your block to have a "real"green screen.
12" Zenith Green Phos. Mon..... $135
Cable for Model I..... $7
Why pay $544.99 for an IBM monitor when you can buy this one. Requires 21022 color/graphics card.

★ **RADIO SHACK SOFTWARE**
I have most all R/S software in stock and it can be yours at 15% off the R/S retail price. Call me for the latest availibility.

Double Density Disk Controller from Aerocomp ("DDC").....$139.95

Make your Model I run in double density. The "DDC" has the most sophisticated data separation circuitry available. "DDC" is available with DOSPLUS 3.3D for a mere 179.95. **RUN FOR THE PHONE!**

ORDER NOW! TOLL FREE 800-527-3582

Write or call ROSE TOLL FREE at 1-800-527-3582. Texas residents call 214-458-1966. Please use the toll free lines for orders and literature requests only. Technical help or service use the Texas line. Prices are mail order only. You pay by VISA or MASTERCARD, you can send check or money order (allow a couple of weeks for personal checks to clean or order COD (we ship COD'S cash, certified check or money order only). Rose will take American money in just about any form. Add freight (UPS where possible) on all orders.Texas residents cough up 5% sales tax. Allow 2-4 weeks for delivery. Order today - I need the money!

Prices subject to change without notice.

TOTAL ACCESS ©

P.O. BOX 3002
RICHARDSON, TX 75080
214-458-1966 -81

‡ With ourchase of Epson Printer

Trademark of PERCOM DATA CO., **Trademark of UNW * TRS80 & Radio Shack are trademarks of Tandy Corp Copyright 1981 TOTAL ACCESS

See List of Advertisers on page 338

This game seems easier to play, since most people are comfortable with linear movements. Moving A in Fig. 11 to any other position requires a simple concatenation of linear transformations. For example, to move A to the middle of the second row, just move A to the right and then down (the order of operations is reversible if no other pieces need be considered). Figure 12 shows a slightly more difficult problem, but it can easily be solved as well:

- 1, R—produces Fig. 13
- 2, D—produces Fig. 14
- 3, D—produces Fig. 15
- 2, R—produces Fig. 16

B		
A		
		C

Figure 7

B		
A		C

Figure 8

B		C
A		

Figure 9

Program Listing 2 Continues

```
230 J(I)=J
240    A(I)=B+A+CHR$(J+64)+A+B:J=J+1
250 NEXT I
260 CLS:PRINTCHR$(23);
270 FOR I=1 TO 9:
280 J=1
290 PRINT A1;A;A1;A;A1
300 FOR I=J TO J+2
310   PRINT A(I);A;
320 NEXT I:PRINT
330 PRINT A3;A;A3;A;A3:PRINT
340 J=J+3:IF J>9 THEN 350 ELSE 290
350 X(0)=64:X(1)=320:X(2)=576:PRINT@974,"MOVE ";K9;
360 PRINT@896,"";:INPUT"ENTER SQUARE, AND SHIFT";J,A9
370 IF J=9 AND A9="C" THEN 600
380 IF J>3 OR J<1 THEN 360 ELSE IF A9="R" OR A9="L" THEN J=K(J)
'STARTING OF ROW
390 IF A9="R" OR A9="L" THEN 440
400 IF A9="U" OR A9="D" THEN 490
410 GOTO 360
420 REM OK, NOW SHIFT THE SQUARES
430 REM RIGHT OR LEFT
440 IF A9="L" THEN 470
450 A4=A(J+2):A(J+2)=A(J+1):A(J+1)=A(J):A(J)=A4
460 GOTO 530
470 A4=A(J):A(J)=A(J+1):A(J+1)=A(J+2):A(J+2)=A4
480 GOTO 530
490 IF A9="D" THEN 520
500 A4=A(J+6):A(J+6)=A(J+3):A(J+3)=A(J):A(J)=A4
510 GOTO 530
520 A4=A(J):A(J)=A(J+3):A(J+3)=A(J+6):A(J+6)=A4
530 REM NOW TEST TO SEE IF EVERYTHING IS CORRECT
540 FOR I=1 TO 9:A5=MID$(A(I),4,1):IF A5<>CHR$(I+64) THEN 580
550 REM DISE PEOPLE USE "FOR I=1TO9:IF INSTR(A(I),CHR$(I+64))=0
THEN 300
```

Program Listing 3

```
10 CLS:PRINT"  HOW TO SQUARE 3 - BY BRUCE POWEL DOUGLASS"
20 PRINT:PRINT"TO PLAY, YOU WILL BE SHOWN A SQUARE WITH"
30 PRINT"A NUMBER OF SMALLER SQUARES.  THE OBJECT IS TO"
40 PRINT"GET THE SQUARES IN LEFT - RIGHT ALPHABETICAL ORDER"
50 PRINT"YOU DO THIS BY EXCHANGING THE ROWS AND COLUMNS"
60 PRINT"THE ROWS AND COLUMNS ARE BOTH NUMBERED 1 - 3"
70 PRINT"SO, TO EXCHANGE ROW 1 WITH COLUMN 2, YOU WOULD ENTER"
80 PRINT" '1,2' AND THE PROGRAM WILL EXECUTE YOUR COMMAND"
90 PRINT"TO CONCEDE, ENTER 9,9"
100 PRINT"PART OF YOUR TASK IS TO DETERMINE  *EXACTLY*  HOW THE"

110 PRINT"SWITCHES MADE (SEE HINT BELOW) - PRESS <ENTER> TO STAR
T"
120 PRINT@832,"D";TAB(13);"(HINT)";TAB(32);"E";:PRINT@896,"E A F
";TAB(11);"SWITCHES TO";TAB(32);"A O B";:PRINT@960,"B";TAB(32);"
F";
130 IF INKEY$="" THEN 130 ELSE CLS:PRINT@535,"JUST A SEC .....";

140 CLEAR 200:DEFSTR-D:DEFINT-K
150 K(1)=1:K(2)=4:K(3)=7
160 A="  ":B=CHR$(191):C=CHR$(131):D=CHR$(176)
170 A1=B+STRING$(5,C)+B
180 A3=B+STRING$(5,D)+B
190 FOR I=1 TO 9
200   J=RND(9):FOR K=1TOI:IF J=J(K) THEN 200 ELSE NEXT K
210 J(I)=J
220    A(I)=B+A+CHR$(J+64)+A+B:J=J+1
230 NEXT I
240 CLS:PRINTCHR$(23);
250 FOR I=1 TO 9:
260 J=1
270 PRINT A1;A;A1;A;A1
280 FOR I=J TO J+2
290   PRINT A(I);A;
300 NEXT I:PRINT
310 PRINT A3;A;A3;A;A3:PRINT
320 J=J+3:IF J>9 THEN 330 ELSE 270
```

Program Listing 3 Continues

Attention: European Subscribers

Due to shipping problems in Europe, we are asking our subscribers to send us their most recent mailing label from 80 Micro. If you are unable to provide us with a label, please send us your name and address, and tell us at what point you are presently in your subscription. This information is very necessary in order to solve a forwarding problem, so we are asking for your co-operation in this matter. Please direct all information to: Attn: Doris Day, 80 Micro, 80 Pine Street, Peterborough, NH 03458.

IS THIS YOUR CUSTOMER?

When your customer needs you, he needs you NOW! Why make him search through a ton of local phone books or back issues of magazines for your number?

THE COMPUTERIST'S DIRECTORY YELLOW PAGES are the one quick reference to your products or services for the personal and small business computerist. Hardware, software, services, supplies and much more are conveniently indexed and cross referenced, placing your company on your customer's desk six months at a time. Now you can have inexpensive advertising insurance assuring that once your product announcement and ads have made their impressions, your customers will be able to find you when they are ready to buy!

THE COMPUTERIST'S DIRECTORY WHITE PAGES are the first attempt by any publication to catalog the individuals and groups that are creating the Information Revolution. The White Pages contain listings by individuals, clubs, user groups, computerized bulletin boards and professional associations. Many listings also include subscribers I.D. numbers (Source, CompuServe, etc.) making the Computerist's Directory a pioneer in facilitating Electronic Mail & Conferencing.

The Computerist's Directory is worth a room full of local phone directories.

HE ONLY HAD TO LOOK IN ONE PLACE!

the Computerist's Directory

The National Phone Book of Computing

PO BOX 405
FORESTVILLE, CA 95436

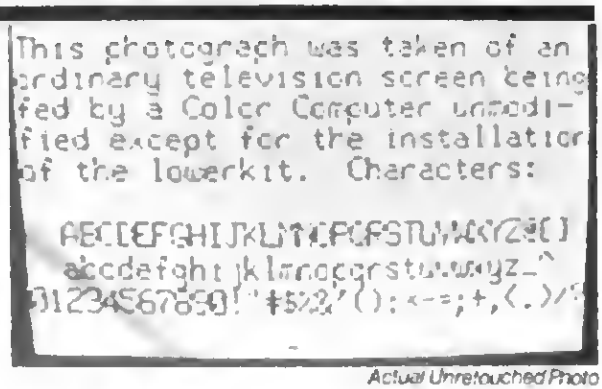
(707) 887-1857

546

READABILITY

That's what you get when you add the Word Processing LOWERKIT to your TRS-80 Color Computer.

Convert your screen from an illegible checkerboard to one that is clear and totally readable.



Actual Unretouched Photo

$79.95 complete plus shipping & handling

- Complete and ready to install — 6 month warranty
- Nothing to solder — fully assembled, tested, guaranteed
- Compatible with all Color Computer software
- Absolutely no loss of hi-resolution graphics
- No wasted memory
- Designed by 80 Microcomputing's Dennis Bathory Kitsz
- Optional cut-off switch restores original reverse-caps display $5. extra specify with order.

MSB Electronics

Drawer 766, Barre, Vermont 05641

(802) 476-7311

328

128 Upper/lower case numbers, symbols and gaming characters in 7 x 9 dot matrix are standard.
Optional character sets (in 5 x 7 or 7 x 9 dot matrix):
APL • Kata Kana • Greek • Cyrillic • Hebrew • Arabic • Math Symbols
General European, $15 per stock set
Character-creation software (CHARIT), $20
Bare board and kits available. Call or write for information.

Lowerkit is a trademark of Green Mountain Micro TRS-80 is a trademark of Tandy Corporation

COD - Visa - Mastercard — Dealer Inquiries Invited

See List of Advertisers on page 339

Program Listing 3 Continued

```
330 X(0)=64:X(1)=320:X(2)=576:PRINT@974,"MOVE ";K9;
340 PRINT@896,"";:INPUT"ENTER ROW, COLUMN TO SWITCH";J,L
350 IF J=9 AND L=9 THEN 470
360 IF J>3 OR J<1 OR L>3 OR L<1 THEN 340
370 IF J=2 THEN J=4 ELSE IF J=3 THEN J=7
380 FOR I=0 TO 6 STEP 3:A4=A(I/3+J):A(I/3+J)=A(I+L):A(I+L)=A4
390 NEXT I
400 REM NOW TEST TO SEE IF EVERYTHING IS CORRECT
410 FOR I=1 TO 9:A$=MID$(A(I),4,1):IF A$<>CHR$(I+64) THEN 450
420 REM DISK PEOPLE USE "FOR I=1TO9:IF INSTR(A(I),CHR$(I+64))=0
THEN 300
430 NEXT I:PRINT@896,"DONE!! AND IN ONLY ";K9;" MOVES!"
440 INPUT"AGAIN";A9:IF A9="Y" OR "YES" THEN 140 ELSE END
450 REM NOT DONE YET!
460 K9=K9+1:GOTO 240 ' REDRAW SCREEN
470 PRINT@896,"QUITTER!! YOU TOOK ";K9;"MOVES      ";:END
```

Program Listing 4

```
10 CLEAR 200:CLS:PRINT"SQUARE 1.1  -  BY BRUCE POWEL DOUGLASS"
20 PRINT:PRINT"TO PLAY, YOU WILL BE SHOWN A SQUARE WITH"
30 PRINT"A NUMBER OF SMALLER SQUARES.  THE OBJECT IS TO"
40 PRINT"GET THE SQUARES IN LEFT - RIGHT ALPHABETICAL ORDER"
50 PRINT"YOU DO THIS BY ROTATING INNER SQUARES, EACH OF"
60 PRINT"WHOM CONTAIN 4 SQUARES. THESE MEDIUM-SIZED SQUARES"
70 PRINT"ARE INDICATED BY THE NUMBERS 1, 2, 3, OR 4."
80 PRINT"SQUARE 1 CONSISTS OF THE SMALL SQUARES 1, 2, 4, AND 5"
90 PRINT"AND SQUARE 2 CONSISTS OF SMALL SQUARES 2,3,5,6."
100 PRINT"SQUARE 3 CONSISTS OF SMALL SQUARES 4,5,6,7 AND"
110 PRINT"SQUARE 4 CONTAINS #'S 5,6,8,9"
120 INPUT"CONTINUE";A$
130 CLS:PRINT"YOU MAY ROTATE THE SQUARES CLOCKWISE (R) OR"
140 PRINT"COUNTER-CLOCKWISE (L): THE POSITIONS OF THE SQUARES"
150 PRINT"ARE ADJUSTED.  TO CONCEDE, ENTER 9,C. THE PROGRAM"
160 PRINT"WILL MIX THE SQUARES UP USING THE NUMBER OF MOVES"
170 PRINT"THAT YOU GIVE IT, AND ALLOW YOU THAT PLUS 2 TO SOLVE T
HE PROBLEM"
180 PRINT"ENTER '0' AS THE NUMBER FOR A LINE PRINTER COPY"
190 PRINT"ENTER THE NUMBER OF MOVES FOR THE MIX";:INPUT Z9
200 DEFSTR A-O:DEFINT I-K
210 K(1)=1:K(2)=2:K(3)=4:K(4)=5
220 A="  ":B=CHR$(191):C=CHR$(131):D=CHR$(176)
230 A1=B+STRING$(5,C)+B
240 A3=B+STRING$(5,D)+B
250 FOR I=1 TO 9
260    A(I)=B+A+CHR$(I+64)+A+B
270 NEXT I
280 FOR I=1 TO Z9 :REM   MIX 'EM UP
290   J=RND(4):K=RND(2)
300 IF K=1 THEN 330
310 A4=A(J):A(J)=A(J+3):A(J+3)=A(J+4):A(J+4)=A(J+1):A(J+1)=A4
320 GOTO 340
330 A4=A(J):A(J)=A(J+1):A(J+1)=A(J+4):A(J+4)=A(J+3):A(J+3)=A4
340 NEXT I
350 CLS:PRINTCHR$(23);
360 FOR I=1 TO 9
370 J=1
380 PRINT A1;A;A1;A;A1
390 FOR I=J TO J+2
400   PRINT A(I);A;
410 NEXT I:PRINT
420 PRINT A3;A;A3;A;A3:PRINT
430 J=J+3:IF J>9 THEN 440 ELSE 380
440 X(0)=64:X(1)=320:X(2)=576:PRINT@974,"MOVE ";K9;
450 PRINT@896,"";:INPUT"ENTER SQUARE, AND ROTATION";J,A9
460 IF J=9 AND A9="C" THEN 620
470 IF J=8 THEN GOSUB 630:GOTO 350
480 IF J>4 OR J<1 THEN 450 ELSE J=K(J) 'STARTING OF SQR
490 IF A9<>"R" THEN IF A9<>"L" THEN 350
500 REM OK, NOW ROTATE THE SQUARES
510 REM K(J) CONTAINS THE POSITIONS FOR ROTATIONS
520 IF A9="L" THEN 550
530 A4=A(J):A(J)=A(J+3):A(J+3)=A(J+4):A(J+4)=A(J+1):A(J+1)=A4
540 GOTO 560
```

Program Listing 4 Continues

- 3, U—produces Fig. 17
- 2, R—produces Fig. 18
- 2, U—produces Fig. 19

Square Three

The last of the three games (Program Listing 3) uses a different move—exchanging a row and column. This game is more difficult to play than the other two because the transformations it uses are more alien to most of us.

Indicate the moves by entering the row and column number to be exchanged. To quit, enter 9,9. I'll let you figure out what pieces will end up where when you perform the exchange.

Another version of each game (Listings

A	B	C

Figure 10

A		

Figure 11

C	B	A

Figure 12

QUALITY SOFTWARE FOR TRS-80 COLOR AND OSI

ADVENTURES!!!
For TRS-80 COLOR and OSI. These Adventures are written in BASIC, are full featured, fast action, full plotted adventures that take 30-50 hours to play. (Adventures are inter-active fantasies. It's like reading a book except that you are the main character as you give the computer commands like "Look in the Coffin" and "Light the torch.")
Adventures require 16K on COLOR-80 and TRS-80. They sell for $14.95 each.

ESCAPE FROM MARS
(by Rodger Olsen)
This ADVENTURE takes place on the RED PLANET. You'll have to explore a Martian city and deal with possibly hostile aliens to survive this one. A good first adventure.

PYRAMID (by Rodger Olsen)
This is our most challenging ADVENTURE. It is a treasure hunt in a pyramid full of problems. Exciting and tough!

TREK ADVENTURE (by Bob Retelle)
This one takes place aboard a familiar starship. The crew has left for good reasons — but they forgot to take you, and now you are in deep trouble.

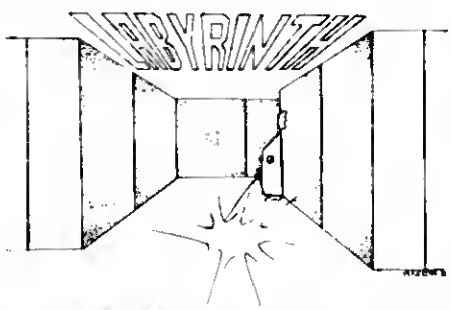
NEW!!
CIRCLE WORLD — We got Kzinti and puppeteers and problems. Our newest and biggest adventure. Requires 12k on OSI and 16K on TRS-80 Color.

NUCLEAR SUB — You are trapped in a nuclear sub at the bottom of the ocean. Escape and even survival is in doubt. Plotted by three of the most sadistic — I mean "creative" minds in adventure programming.

VENTURER!—A fast action all machine code Arcade game that feels like an adventure. Go berserk as you sneak past the DREADED HALL MONSTERS to gather treasure in room after room, killing the NASTIES as you go. Great color, high res graphics, sound and Joystick game for the TRS-80 Color or OSI machines. (black and white and silent on OSI.) Tape only. $19.95.

BASIC THAT ZOOMMS!!
AT LAST AN AFFORDABLE COMPILER FOR OSI AND TRS-80 COLOR MACHINES!!! The compiler allows you to write your programs in easy BASIC and then automatically generates a machine code equivalent that runs 50 to 150 times faster.
It does have some limitations. It takes at least 8K of RAM to run the compiler and it does only support a subset of BASIC—about 20 commands including FOR, NEXT, END, GOSUB, GOTO, RETURN, END, PRINT, STOP, USR(X), PEEK, POKE, *, /, +, -, X, X, =, VARIABLE NAMES A-Z, A SUBSCRIPTED VARIABLE, and INTEGER NUMBERS FROM 0 - 64K.
TINY COMPILER is written in BASIC. It generates native, relocatable 6502 or 6809 code. It comes with a 20 page manual and can be modified or augmented by the user. $24.95 on tape or disk for OSI or TRS-80 Color.

LABYRINTH — 16K EXTENDED COLOR BASIC — With amazing 3D graphics, you fight your way through a maze facing real time monsters. The graphics are real enough to cause claustrophobia. The most realistic game that I have ever seen on either system. $14.95. (8K on OSI)



PROGRAMMERS!
SEE YOUR PROGRAM IN THIS SPACE!! Aardvark traditionally pays the highest commissions in the industry and gives programs the widest possible coverage. Quality is the keyword. If your program is good and you want it presented by the best, send it to Aardvark.

QUEST — A NEW IDEA IN ADVENTURE GAMES! Different from all the others. Quest is played on a computer generated map of Alesia. Your job is to gather men and supplias by combat, bargaining, exploration of ruins and temples and outright banditry. When your force is strong enough, you attack the Citadel of Moorlock in a life or death battle to the finish. Playable in 2 to 5 hours, this one is different every time. 16K COLOR-80 OR TRS-80. ONLY $14.95.

SPACE ZAPPER — Protect your central Star Base from ships that attack from all four sides. Fast reflexes are required as the action speeds up. Great for kids or Dads. This game has high speed high resolution graphics and looks as if it just stepped out of the arcades. — 16K extended or 32K disk. BASIC TRS-80. Color only. $14.95.

Please specify system on all orders

This is only a partial listing of what we have to offer. We have arcade and thinking games, utilities and business programs for the OS1 and TRS-80 Color. We add new programs every week. Send $1.00 for our complete catalog.

AARDVARK - 80

TRS 80 COLOR **2352 S. Commerce, Walled Lake, MI 48088** **OSI**

(313) 669-3110

107

See List of Advertisers on page 338

Program Listing 4 Continued

```
550 A4=A(J):A(J)=A(J+1):A(J+1)=A(J+4):A(J+4)=A(J+3):A(J+3)=A4
560 REM NOW TEST TO SEE IF EVERYTHING IS CORRECT
570 FOR I=1 TO 9:A5=MID$(A(I),4,1):IF A5<>CHR$(I+64) THEN 600
580 NEXT I:PRINT@896,"DONE!! AND IN ONLY ";K9;" MOVES!"
590 INPUT"AGAIN";A9:IF A9="Y" OR "YES" THEN 200 ELSE END
600 REM NOT DONE YET!
610 K9=K9+1:IF K9<Z9+3 THEN GOTO 350 ' REDRAW SCREEN
620 PRINT@896,"TURKEY!! YOU TOOK TOO MANY MOVES!";:END
630 LPRINT"SQUARE 1.1  MOVE # ";K9
640 FOR I=0 TO 2:LPRINT"!.....!.....!.....!"
650   FOR J=1 TO 3
660     GOSUB 700 : LPRINT Q$;
670   NEXT J : LPRINT "!"
680 NEXT I
690 LPRINT"!.....!.....!.....!":LPRINT" ";:RETURN
700 Q$="!  "+MID$(A(I*3+J),4,1)+"  ":RETURN
```

Program Listing 5

```
10 CLEAR200:CLS:PRINT" SQUARE 2.1  -   BY BRUCE POWEL DOUGLASS"
20 PRINT:PRINT"TO PLAY, YOU WILL BE SHOWN A SQUARE WITH"
30 PRINT"A NUMBER OF SMALLER SQUARES.  THE OBJECT IS TO"
40 PRINT"GET THE SQUARES IN LEFT - RIGHT ALPHABETICAL ORDER"
50 PRINT"YOU DO THIS BY SHIFTING THE ROWS LEFT OR RIGHT"
60 PRINT"OR THE COLUMNS UP OR DOWN.  THIS SHIFT IS REALLY A"
70 PRINT"ROTATE, SINCE THE SQUARE THAT LEAVES THE BLOCKS WILL"
80 PRINT"REAPPEAR AT THE OTHER END OF THE ROW OR COLUMN."
90 INPUT"CONTINUE";A$:CLS
100 PRINT"THE ROWS AND COLUMNS ARE BOTH NUMBERED 1 - 3"
110 PRINT"AND THE PROGRAM TELLS WHICH YOU MEAN BY THE PRESENCE"
120 PRINT"OF A ROW COMMAND (R OR L), OR A COLUMN COMMAND (U OR O
)"
130 PRINT"TO CONCEDE, ENTER 9,C."
140 PRINT"TO SENT IT TO THE PRINTER, ENTER '0,X'.  THE PROGRAM"
150 PRINT"WILL MIX UP THE ORDER USING THE NUMBER OF MOVES"
160 PRINT"THAT YOU GIVE IT - ENTER THE NUMBER OF MOVES"
170 INPUT Z9
180 RANDOM:DEFSTR-D:DEFINT-K:Z0=0:K9=0
190 K(1)=1:K(2)=4:K(3)=7
200 A="  ";B=CHR$(191):C=CHR$(131):D=CHR$(176)
210 A1=B+STRING$(5,C)+B
220 A3=B+STRING$(5,D)+B
230 FOR I=1 TO 9
240    A(I)=B+A+CHR$(I+64)+A+B
250 NEXT I:IF Z9=0 THEN 300
260 FOR I=1 TO Z9:K=RND(2):L=RND(2)
270 IF K=1 THEN 330
280 M=(RND(3)-1)*3+1:IF L=2 THEN 310
290 A4=A(M+2):A(M+2)=A(M+1):A(M+1)=A(M):A(M)=A4
300 GOTO 370
310 A4=A(M):A(M)=A(M+1):A(M+1)=A(M+2):A(M+2)=A4
320 GOTO 370
330 M=RND(3):IF L=1 THEN 360
340 A4=A(M+6):A(M+6)=A(M+3):A(M+3)=A(M):A(M)=A4
350 GOTO 370
360 A4=A(M):A(M)=A(M+3):A(M+3)=A(M+6):A(M+6)=A4
370 NEXT I
380 CLS:PRINTCHR$(23);
390 FOR I=1 TO 9
400 J=1
410 PRINT A1;A;A1;A;A1
420 FOR I=J TO J+2
430   PRINT A(I);A;
440 NEXT I:PRINT
450 PRINT A3;A;A3;A;A3:PRINT
460 J=J+3:IF J>9 THEN 470 ELSE 410
470 X(0)=64:X(1)=320:X(2)=576:PRINT@974,"MOVE ";K9;
480 IF Z0=-1 THEN 700
490 PRINT@896,"";:INPUT"ENTER SQUARE, AND SHIFT";J,A9
500 IF J=0 THEN GOSUB 750:GOTO 300
510 IF J=9 AND A9="C" THEN 740
520 IF J>3 OR J<1 THEN 490 ELSE IF A9="R" OR A9="L" THEN J=K(J)
```

Program Listing 5 Continues

4-6) is presented as well. Rather than set the board up randomly, the game asks for the number of moves you want made. The program starts from the goal state position and makes that number of random moves. Your mission is to solve the problem in that number of moves plus two (you get to make one bad move and retract it). These programs also allow you to print the board at any time by entering zero as the first argument.

Parting Problem

There are two numbers between 1 and 100 (1 and 100 are excluded from the solution). Mr. P. knows the product of these two numbers, and Ms. S. knows their sum. Rather than exchange the infor-

A	C	B

Figure 13

A		B
	C	

Figure 14

A		
	C	B

Figure 15

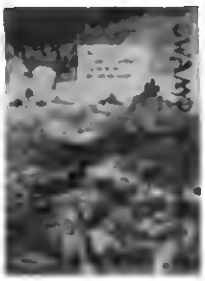
Why Play Just Any Old Game When You Could Be Playing The Best?

Take a look at what we have to offer and we're sure you'll agree that Instant Software has the best games at the best prices.

COSMIC PATROL—Your ship: a small interstellar patrol craft. Your mission: to defend Terran space, and prey on the Quelon supply ships carrying essential parts and lubricants to the hostile robotic forces. The freighters are fairly easy picking for the accomplished starship pilot. But watch out! The I-Fighter escorts are armed and fast...and they never miss. Fast, real-time action, impressive sound option, and superb graphics make this machine-code program the best of its genre.
Model I or III, Level II, 16K (PMC compatible) #0223R TAPE $14.95

ALIEN ATTACK FORCE—The invaders are coming! Earth's defenses are all dead...except *your* Laser base. The 550 approaching invaders are speeding toward you in 10 attack formations of 55 invaders each, and in four different types of attack ships, including the most difficult to destroy—the short-profile attack craft. You must destroy these invaders or the Earth is doomed!
Model I or III, Level II, 16K (PMC compatible) #0240R TAPE $9.95

SPARROW COMMANDER—Experience the feeling of raw power. Lead your squadron of sparrows safely to the nesting ground while the evil Cloud People try to destroy you and your compatriots-in-flight. Watch out for falling brickbats, safes, even the kitchen sink, as your troops fly past the castle. Will you rank as a "Wingless Wonder" or "Exemplar Bird"?
Model I, 32K, 1 disk drive #0387RD DISK $19.95

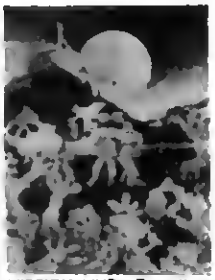


SWAMP WAR—A neutron star has damaged the hyper-space drive on your trusty ship "The Stellar Spaniel." You're stranded on a water-covered planet. The only land available is a cluster of nine islands. Your only hope is to use your maintenance droids to collect old supply transporters from those islands. Sounds easy...until you meet the Swamp Creatures!
Model I or III, Level II, 16K #0312R TAPE $14.95

SANTA PARAVIA—Castles...serfs...feudal wars....Build a powerful kingdom from your tiny city state. Repel the invading forces from the neighboring castle. Set in Italy in the year 1400AD, this challenging program tests all your leadership skills. Will you be a wise and competent ruler or a Machiavellian despot?
Model I or III, Level II, 16K (PMC compatible) #0043R TAPE $9.95

MASTER REVERSI—One of the most exciting games in the world. Experience the thrill of head-to-head competition as you challenge your friends, or the computer, to a game of strategy and skill that will keep you coming back for more. Start training now for the next World Championship.
Model I, Level II, 16K #0378RD DISK $29.95

SPACE SHUTTLE—The ultimate simulation of the Ultimate Flight puts you in the Command Pilot's seat of America's first reusable space shuttle. You lift-off, orbit, and attempt to guide the craft safely back to Earth. The slightest error could spell disaster. This real-time program is "the closest you can get to the real thing!"
Model I or III, Level II, 16K #0332R TAPE $14.95



MISSION: MUD—From the slimy Mud Patch come...THE MUD MONSTERS! Deadly to the human touch, these muck creatures are about to invade the Earth base city. Your only hope for defense is to find the old caches of hidden weapons before the MUD MONSTERS do. And even if you do, you don't know whether your shots will destroy them or clone them! Can you survive the MUD MONSTERS? You'll never know until you try.
Model I, Level II, 32K or Model III with convert command (PMC compatible) #0325RD DISK $19.95

BALL TURRET GUNNER—You are at the control console of an LW-1417 Stratoblazer (Type B Laser Weapon). The PRC Exxonerator Class light fighters (code name: GNAT) are hurtling toward you from behind. Your Laser turret spins around, the GNATs' evasive tactics have them dancing in your sights. You only have a fraction of a second to destroy or be destroyed. This is more than just a game. Experience it.
Model I, Level II, 16K #0051R TAPE $9.95

KITCHEN SINK—Defend the ancient castle of the Cloud People from the hoard of winged invaders. Use anything you can lay your hands on: brickbats, safes, even...the kitchen sink? The native savages below will let you use their armed boats...for a price. Only your aim and your judgement can save the Cloud People before time runs out.
Model I, 32K, 1 disk drive #0386RD DISK $19.95

All our programs are fully documented and fully guaranteed. To order, simply fill in the coupon and mail to INSTANT SOFTWARE, Rte. 101 and Elm St., Peterborough, NH 03458 Or call toll free, 1-800-258-5473.

YES—I want to play the best! Please send me:

_____ copies of #0043R @ $9.95
_____ copies of #0051R @ $9.95
_____ copies of #0240R @ $9.95
_____ copies of #0223R @ $14.95
_____ copies of #0312R @ $14.95
_____ copies of #0325RD @ $19.95
_____ copies of #0332R @ $14.95
_____ copies of #0378RD @ $29.95
_____ copies of #0386RD @ $19.95
_____ copies of #0387RD @ $19.95

Code-88

___ VISA ___ MasterCard ___ AMEX ___ Check ___ Money Order

Card # _____ Name _____
Interbank # _____ Address _____
Exp. Date _____ City _____
Signeture _____ State _____ Zip _____

Instant Software Inc. Peterborough, NH 03458
A subsidiary of Weyne Green Inc.

Call Toll Free, 1-800-258-5473

Program Listing 5 Continued

```
'STARTING OF ROW
530 IF A9="R" OR A9="L" THEN 500
540 IF A9="U" OR A9="D" THEN 630
550 GOTO 300
560 REM OK, NOW SHIFT THE SQUARES
570 REM RIGHT OR LEFT
580 IF A9="L" THEN 610
590 A4=A(J+2):A(J+2)=A(J+1):A(J+1)=A(J):A(J)=A4
600 GOTO 670
610 A4=A(J):A(J)=A(J+1):A(J+1)=A(J+2):A(J+2)=A4
620 GOTO 670
630 IF A9="U" THEN 660
640 A4=A(J+6):A(J+6)=A(J+3):A(J+3)=A(J):A(J)=A4
650 GOTO 670
660 A4=A(J):A(J)=A(J+3):A(J+3)=A(J+6):A(J+6)=A4
670 REM NOW TEST TO SEE IF EVERYTHING IS CORRECT
680 FOR I=1 TO 9:A5=MID$(A(I),4,1):IF A5<>CHR$(I+64) THEN 720
690 NEXT I:Z0=-1:GOTO300
700 PRINT@896,"DONE!! AND IN ONLY ";K9+1;" MOVES!"
710 INPUT"AGAIN";A9:IF A9="Y" OR A9$="YES" THEN 130 ELSE END
720 REM NOT DONE YET!
730 K9=K9+1:IF K9>Z9+2 THEN 740 ELSE GOTO 300 ' REDRAW SCREEN
740 PRINT@768,"YOU TOOK TOO MANY MOVES!  ":END
750 LPRINT"SQUARE 2.2  MOVE # ";K9
760 FOR I=0 TO 2:LPRINT"..................."
770   FOR J=1 TO 3
780     GOSUB 820 : LPRINT Q$;
790   NEXT J : LPRINT "!"
800 NEXT I
810 LPRINT"!.....!.....!.....!":LPRINT" ":RETURN
820 Q$="!  "+MID$(A(I*3+J),4,1)+"  ":RETURN
```

Program Listing 6

```
10 CLEAR200:CLS:PRINT"        SQUARE 3.3  -  BY BRUCE POWEL DOUGL
ASS"
20 PRINT:PRINT"TO PLAY, YOU WILL BE SHOWN A SQUARE WITH"
30 PRINT"A NUMBER OF SMALLER SQUARES.  THE OBJECT IS TO"
40 PRINT"GET THE SQUARES IN LEFT - RIGHT ALPHABETICAL ORDER"
50 PRINT"YOU DO THIS BY EXCHANGING THE ROWS AND COLUMNS"
60 PRINT"THE ROWS AND COLUMNS ARE BOTH NUMBERED 1 - 3"
70 PRINT"SO, TO EXCHANGE ROW 1 WITH COLUMN 2, YOU WOULD ENTER"
80 PRINT" '1,2' AND THE PROGRAM WILL EXECUTE YOUR COMMAND"
90 PRINT"ENTERING A '0,1' WILL SEND THE CURRENT POSTION TO THE P
RINTER"
100 PRINT"TO CONCEDE, ENTER 9,9"
110 PRINTTAB(15);:INPUT"NEXT PAGE";A$:CLS
120 PRINT"PART OF YOUR TASK IS TO DETERMINE  *EXACTLY*  HOW THE"

130 PRINT"SWITCHES MADE (SEE HINT BELOW)"
140 PRINT@320,"D";TAB(13);"(RINT)";TAB(32);"E";:PRINT@384,"E A F
";TAB(11);"SWITCHES TO";TAB(32);"A D H";:PRINT@448,"H";TAB(32);"
F"
150 PRINT:PRINT"YOU WILL HAVE THE DEPTH OF MIX-UP+2 MOVES TO FIN
D THE SOLUTION":INPUT"ENTER THE DEPTH OF THE MIX-UP";Z9:CLS:PRIN
T@534,"JUST A SEC .....";
160 DEFSTR A-D:DEFINT I-K:Z0=0
170 K(1)=1:K(2)=4:K(3)=7
180 A="  ":B=CHR$(191):C=CHR$(131):D=CHR$(176)
190 A1=B+STRING$(5,C)+B
200 A3=B+STRING$(5,D)+B
210 FOR I=1 TO 9
220    A(I)=B+A+CHR$(I+64)+A+B
230 NEXT I:FOR K=1 TO Z9:J=RND(3):L=RND(3)
240 IF J=2 THEN J=4 ELSE IF J=3 THEN J=7
250 FOR I=0 TO 6 STEP 3:A4=A(I/3+J):A(I/3+J)=A(I+L):A(I+L)=A4
260 NEXT I,K
270 CLS:PRINTCHR$(23);
280 FOR I=1 TO 9:
290 J=1
300 PRINT A1;A;A1;A;A1
310 FOR I=J TO J+2
320   PRINT A(I);A;
```

mation directly, and being perfect logicians, they have the following conversation:

Mr. P.: I don't know what the numbers are.
Ms. S.: I knew you didn't. Neither do I.
Mr. P.: AHA! Now I know what they are!
Ms. S.: (smiling) Now I do too!

The question is, of course, what are the two numbers?

I'm not going to tell you what they are, but I will give you a hint. There are two methods for solving this problem. One involves brute force, and the other uses an analog computer (made of paper).

A		
B		C

Figure 16

A		C
B		

Figure 17

A		C
	B	

Figure 18

Subscription Problem?

80 Micro does not keep subscription records on the premises, therefore calling us only adds time and doesn't solve the problem.

Please send a description of the problem and your most recent address label to:

80micro
Subscription Dept.
PO Box 981
Farmingdale, NY 11737

Thank you and enjoy your subscription

MODEL III TRS-80®
Software on Disks!
At last! All Model III.
Put it in — Watch it run.

GUARANTEED — SEND FOR FREE CATALOG. INCLUDE $9.95 FOR DISK VERSION AND A FREE PROGRAM.

STAR★WARE™

✓396

Rt. 5, Box 277-C
Benbrook, TX 76126

IBM PC
TRS-80 • MODEL II
ADVANCED PRODUCTIVITY SYSTEM

APS is a productivity booster that can be compared with IBM's SPF system. The sophisticated user will settle for nothing less. Note these features:

- Menu driven, user friendly general purpose architecture
- Dual screen operation
- Primary, Line and Function key commands
- Separate Edit and Browse subsystems
- Dynamically adjustable scrolling in all four directions
- External datasets menus and create
- Text formatter, similar to IBM's SCRIPT/GML formatter, is designed for large documents
- Built-in utilities allow dataset format conversions

All registered users of our products receive full maintenance support. For more information contact:

ARRIX LOGIC SYSTEMS INC.,
P.O. BOX 142
DON MILLS, ONTARIO ✓395
CANADA M3C 2R6
* Registered Trademark of Tandy Corporation

80micro
Back Issues

January 1980.....$5.00
February to June 1980.....3.00
Single back issue
July 1980 on.....3.50
Single back issue

Add $1.00 per magazine for shipping

10 or more back issues
add $7.50 per order for shipping

Back Issues • Attn: Pauline Johnstone
80 Pine St • Peterborough, NH 03458

softbyte computing
announces . . . ✓398

STAR SEARCH ASTRONOMY GUIDE Instantly display a map of the skies overhead for any date and time entered that plots the brightest stars, double stars, star clusters, nebula and the external galaxies.....$19.95

DATA-FILE MANAGER A complete information filing and retrieval system that includes an alpha & numeric sort, user-defined record formats of up to 240 characters and 12 fields, multi-field search and totals, and auto memory size recognition.....$19.95

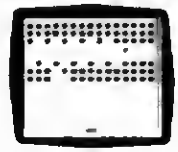
STOCK CHART GRAPHER Charts any stock's trading prices for up to 60 days, weeks, etc. along with volume of shares traded, price moving average and relative price change.....$19.95

THE COUPON SHOPPER A convenient and organized way to keep records of your redeemable coupons on hand that also matches those coupons to your program-prepared shopping list.....$9.95

All programs are furnished on cassette for Model I or III with at least 16K. Disk owners inquire as to disk availability and prices. Overseas add $3.00 and CT residents add sales tax.

Softbyte Computing, Box 217, Wallingford, CT 06492

BLOCK BREAKER



A fast and furious action game designed to challenge players of all ages and skills! Special features include:

- 9 levels of play
- sound effects
- SAVES TOP TEN SCORES
- machine language

For the TRS-80* Model I Level II 16K or Model III 16K.

Price of $14.95 includes shipping and handling. To order call (513) 435-5966 or send check or money order to:

CEDAR Software Co

Cedar Software Co.
1943 Woodson Court
Centerville, Ohio 45459

✓397

Dealer inquiries invited
* Trademark of TANDY CORP

This publication is available in microform.

University Microfilms International

Please send additional information
Name _____
Institution _____
Street _____
City _____
State _____ Zip _____

300 North Zeeb Road
Dept. P.R.
Ann Arbor, Mi. 48106
U.S.A.

30-32 Mortimer Street
Dept. P.R.
London W1N 7RA
England

"JUMP A DRAGON!"

end win 10 Game programs including *ALL* those in this Ad.

SIR EGGBERT JUMPER* for the COLOR COMPUTER

Help Sir Eggbert Jump his way through 8 different dungeon levels -- facing several creatures and finally a dragon while collecting keys, treasure, and jewels. The first five adventurers to beat the dragon and complete the entry form after 8/12/82 win the programs!

Also — Dark Castle Game System *programmable graphics dungeon*

Alpha Mission* *travel deep caves to find the alien spaceship.*

Invasion of the Termites* *blast termites before they eat your house.*

Wizard *two players face off with spells*

$12.95 ea. cassette post-pd. 16k ext. Color Basic.

*Joysticks Required

D.L. DAWSON
4808 DAVENPORT #2
OMAHA, NE 68132

✓400

FOR
MODEL II's
ONLY

TIRED OF TYPING IN LENGTHY FIELD STATEMENTS FOR PROGRAMS WHICH ANALYZE PROFILE FILES? WANT TO RESTRUCTURE A PROFILE FILE MOVING ITEMS IN SEGMENT 1 TO SEGMENT 2? YOU NEED FIELDER! YOU MAY NEVER HAVE TO TYPE THE WORDS "FIELD.....AS....." AGAIN. SEND $5.00* FOR A SAMPLE OUTPUT AND PROGRAM.

APPLIED TO PURCHASE.

FIELDER . . . $55.

SWAYBACK SOFTWARE
BOX 1351
MERCHANTVILLE, NEW JERSEY
08109
609-663-2878

✓391

✓See List of Advertisers on page 338

I would like to hear your approaches to solutions. I will mention readers that send in the most elegant solutions. Send your ideas to my address below. Cries for the answer will remain unanswered (unless accompanied by a bribe). I didn't even tell my own mother the solution! ■

Bruce Powel Douglass
1005 West Main
Vermillion, SO 57069

A	B	C

Figure 19

Program Listing 6 continued

```
330 NEXT I:PRINT
340 PRINT A3;A;A3;A;A3:PRINT
350 J=J+3:IF J>9 THEN 360 ELSE 300
360 X(0)=64:X(1)=320:X(2)=576:PRINT@974,"MOVE ";K9;
365 IF K9>z9+3 THEN 510 ELSE IF z0=-1 THEN 470
370 PRINT@896,"";:INPUT"ENTER ROW, COLUMN TO SWITCH";J,L
380 IF J=0 THEN GOSUB 520:GOTO 270
390 IF J=9 AND L=9 THEN 510
400 IF J>3 OR J<1 OR L>3 OR L<1 TBEN 370
410 IF J=2 THEN J=4 ELSE IF J=3 THEN J=7
420 FOR I=0 TO 6 STEP 3:A4=A(I/3+J):A(I/3+J)=A(I+L):A(I+L)=A4
430 NEXT I
440 REM NOW TEST TO SEE IF EVERYTHING IS CORRECT
450 FOR I=1 TO 9:A5=MID$(A(I),4,1):IF A5<>CHR$(I+64) THEN 490
460 NEXT I:z0=-1:GOTO 270
470 PRINT@896,"DONE!! AND IN ONLY ";K9;" MOVES!"
480 INPUT"AGAIN";A9:IF A9="Y" OR A9="YES" TBEN CLS:GOTO 150 ELSE
 END
490 REM NOT DONE YET!
500 K9=K9+1:GOTO 270 ' REDRAW SCREEN
510 PRINT@768,"YOU TOOK TOO MANY MOVES!!";:GOTO 480
520 LPRINT"SQUARE 3.3  MOVE # ";K9
530 FOR I=0 TO 2:LPRINT"..................."
540   FOR J=1 TO 3
550     GOSUB 590 : LPRINT Q$;
560   NEXT J : LPRINT "!"
570 NEXT I
580 LPRINT"!.....!.....!.....!":LPRINT" ":RETURN
590 Q$="!  "+MID$(A(I*3+J),4,1)+"  ":RETURN
```

MISOSYS MISOSYS MISOSYS MISOSYS MISOSYS MISOSYS MISOSYS MISOSYS MISOSYS MISOSYS MISOSYS

EDAS 3.5

EDAS is e sophisticated Editor and Assembler for TRS-80 I & III
- All text mey be input in uppar or lower case.
- Assemble directly from one or more disk files via *GET.
- Assemble to disk or memory
- Binery, octal, decimal, hex, end string constants; Multiple constants mey be input on a single line.
- CMDFILE utility included.
- Conditional essembly support.
- Cross-Reference utility.
- DOS functions DIR, FREE, KILL, end LIST ere supported.
- 14-charecter lebels including special chars. "@", "$",".","?".
- Editor includes block move, globel change, renumber, find.
- EOTASM & M-80 source files can be read or written.
- Expression eveluetor supports +, −, *, /, MOD plus logical AND, OR, end XOR.
- Peged & titled listings with page numbers end date/time.
- PAGE, TITLE, SUBTTL, SPACE, & COM pseudo-ops supported.
- Set memory size, page prompt, JCL execution, Abort option.
- EDAS is supported with TRSDOS compatible DOSs (LDOS, VTOS).
- Price is $78.00 + $4.00. S&H.

MISOSYS SERIOUS SOFTWARE

MISOSYS MISOSYS MISOSYS MISOSYS MISOSYS

LDOS Version 5.1 is the Ultimate in Operating Systems for the TRS-80 Models I and III. MISOSYS is your East Coast Headquarters for LDOS, the documented system! Version 5.1 is priced at $129.00 + $5.00 S&H per system. Deduct $35 if ordering both.

LDOS 5.1

SASOSIW SASOSIW SASOSIW SASOSIW SASOSIW

DSMBLR: A 2-pass Z-80 labeling disassembler. Output to Video, Printer, or Disk. $20
DISKMOD: Turn EDTASM 1.2 into disk assembler with block move, global change, more. $30
THE 800Ks: Volume I gives access to all math operations in Level II. Volume II explains KI, DO, PR & Cassette I/O. Per volume: $15

All programs Model I/III compatible. For S&H include $2 + $.50 per unit. (VA res. add 4%)

VISA

MISOSYS - Dept. M4
P.D. Box 4848
Alexandria, VA 22303-0848
703-960-2998 MicroNET 70140,310
Dealers Inquiry Invited

MasterCard

123

LDOS SUPPORT

CON80Z: Translates assembler source files from Intel 8080 to Zilog Z-80. $50
CONVCPM: Transfers CPM files (8"-SDEN, selected 5") to LDOS diskettes. $30
FED: Screen-oriented FILE "zapping" utility. $40
FILTER: Application pack of 14 filter programs with assembler source. $60
HELP/QRC: Very fast screen prompts for LIB, LBASIC Utilities. With Quick Reference Card. $25
MONITOR: Take control of I/O disk errors to attempt recovery w/o ABORT. $25
LED: The LDOS ASCII/HEX word processing type editor. Edit JCL KSM FIX + $40
MSP-01: This support package includes PARMDIR: a JCL file generator & report generator for DIR info; MEMDIR: produces a DIR of high memory; DOAUTO: exec any AUTO command; DOCONFIG: re-initialize to a CONFIG/SYS. $50
POS: Add Partitioned Data Set functions. Directly exec CMD members. $40
SOLE: Create Mod-I bootable DDEN diskettes. $25
ZGRAPH: Graphic applications created on the screen with full editing. $40

MISOSYS MISOSYS MISOSYS MISOSYS MISOSYS MISOSYS MISOSYS MISOSYS MISOSYS MISOSYS MISOSYS

SASOSIW SASOSIW SASOSIW SASOSIW SASOSIW SASOSIW SASOSIW SASOSIW SASOSIW SASOSIW SASOSIW

State Of The Art Word Processing Tools

for CP/M ®, TRS-80 ®, and IBM-PC Word Processors

Complete Document Proofreading Systems

Only From Aspen Software

PROOFREADER™

Featuring Official Version of Random House® Dictionary

- Easy To Use - full menu driven
- Complete Accuracy - looks up every word; does not use less accurate root word analysis
- Full Interactive Correction* - shows complete context of unknown words; menu choice to correct, learn or accept words; all corrections double checked
- Instant Access to Dictionary - look up any word while correcting without manual dictionary
- Rapid Proofing and Correcting
- Compact** - Random House Dictionary supplied in size to fit your system (50,000 words standard)
- All Of The Additional Features, Same Competitive Price

GRAMMATIK™

Beyond Spelling Checking

- Detects typos, punctuation errors, capitalization errors, unbalanced parentheses and quotation marks
- Analyzes Your Writing Style for Average Sentence and Word Length, Word Use Profile and More
- Finds Non-Standard Usage and Spelling Errors
- Finds Overworked and Wordy Phrases Using Customizable Dictionary Containing Over 500 Entries
- Errors Optionally Marked for Easy Correction, Sent to Printer or Displayed on Screen

"If you use a word processor and a spelling checker, then you should investigate the unique capabilities of this program. Grammatik is a surprisingly fast and easy tool for analyzing writing style and punctuation."

—Bob Louden in InfoWorld, 12/81

"The programs together (Proofreader and Grammatik) offer a dynamic tool for comprehensive editing beyond spelling corrections."

—Dona Z. Meilach in Interface Age, 5/82

"Grammatik is the perfect complement to a spelling check program."

—Dr. Alan R. Miller in Interface Age, 5/82

"For the user who is as tight with his dollars as I, Proofreader is the program of choice."

—Stephen Kimmel in Creative Computing, 3/82

Grammatik has been selected as an officially approved Osborne Computer software program.

GRAMMATIK™

\+ PROOFREADER™

= NO ERRORS

Aspen Software also has its own full featured word processor called Writer's Companion for all these systems. One of the best implementations of Ratfor (Rational Fortran) is available, too, along with an automatic pretty printer. Please call or write for more details about these products.

---

*Automatic correction optional on the TRS-80 Model I/III. Interactive dictionary access not available on TRS-80 versions.

**Standard dictionary sizes include 25,000, 35,000 and 50,000 words. Larger and British versions available for media charge. Osborne-1 supplied with 25,000 words, non-Random House dictionary. Legal, medical and foreign language dictionaries will be available in the near future.

--CP/M versions, require CP/M version 2, 48K. Standard 8" single density, Northstar, Osborne-1, Omikron and Apple formats available directly from Aspen Software. These and most other formats also available from Digital Marketing. Proofreader - $129.00, Grammatik - $150.00; Both - $250.00

--TRS-80 Model I/III require 32K, 1 drive, Modal II requires 64K, 1 drive, TRS-80 Model I/III Proofreader - $59.00, Interactive correction option - $30.00, Grammatik - $59.00, All - $139.00

TRS-80 Model II Proofreader - $99.00, Grammatik - $990.00, Both - $179.00

--8086/8088 version will run under MS-DOS or equivalent (incl. IBM Personal Computer DOS), requires 64K. MS-DOS formats standard single density 8" and IBM PC 5.25"

CP/M-86 version scheduled for Summer 1982 availability. Proofreader - $129.00

Grammatik - $150.00, Both - $250.00

--Manuals only $8.00 each, $15.00 for both

IMPORTANT ORDERING INFORMATION: You MUST specify computer model, operating system, memory size and format and number of disk drives when ordering either software or manuals alone. All U.S., Canada and Mexico orders include first class shipping in price. We accept cash, check, money order, VISA and Master Card. Cost on manual only orders can be credited to final purchase. NM residents add 4% sales tax.

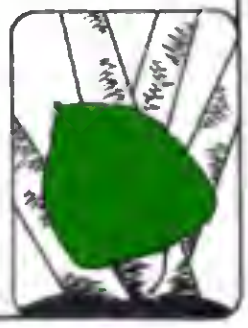
(Dealer and OEM inquiries welcome)

Random House is a registered trademark of Random House, Inc. Other registered trademarks: CP/M, Digital Research; TRS-80, Tandy Corp.; MS-DOS, Microsoft; IBM, IBM; Proofreader, Grammatik, Aspen Software Co.

Distributed By:

DIGITAL MARKETING

DIGITAL MARKETING CORPORATION



Aspen Software Co.

P.O. Box 339-M Tijeras, NM 87059 - (505) 281-1634

See List of Advertisers on page 338

EDUCATION 80

by Earl R. Savage

Let's take a look at microcomputer games. Do they have a legitimate place in the learning process?

To address this topic properly we must acknowledge the prevalence of learning games from very early ages on to adulthood. Countless elementary school students participate in classroom spelling bees and arithmetic contests; even graduate students set up and run fictitious corporations and model congresses.

These examples demonstrate that some games have a place in education. If games make learning fun, why, now that the computer is involved, does the question of their usefulness arise again? Is it because computer games are so much fun that learning seems to be missing? Or do teachers and parents still associate microcomputer games with those video-arcade games which have little educational merit other than developing fine eye-hand coordination?

In most classrooms, arcade games are useful only as entertaining rewards for the learning students acquire through some other means.

To be legitimate in school, a game must present some useful educational outcome. It is immaterial whether the computer version is more effective than a non-computer version—we are not trying to justify the computer but to evaluate the game. If at least one worthwhile learning objective is not found, the game is entertaining at best, and should be treated as such.

Education by Accident

While evaluating your software game library, keep in mind that learning can be direct or indirect in nature. A simple number guessing game may appear at first glance to be strictly entertaining (something like "Guess the secret number between one and 25"). If the computer simply responds with Right or Wrong to each guess, the game is entertainment (and boring at that). On the other hand, if the responses are "too high" or "too low," there is an opportunity for learning. In this case, rather than make random guesses, the successful player develops a strategy to maximize his chances. That process leads to a better understanding of the number line.

When played on a two-dimensional grid, guessing games can lead to further number conceptualization. If a third dimension is added (as in Depth Charge or Find the Sub), the benefits to an older pupil can be quite worthwhile.

The student playing a leader-type game can learn quite a lot. The purpose of the game may be to lead a wagon train to California or to govern an island or planetary kingdom. In a well-designed game of this type, the student can develop a good understanding for the interrelationships among factors which affect a community—taxation, food supply, mutual defense and resource management.

Lunar Lander and Human Cannonball help teach some simple science principles. In the latter, a student must understand how trajectory is affected by the angle of the cannon and the force of the propellant so the man lands in the net consistently.

The lunar lander will crash repeatedly until the player learns the relationships between mass, thrust, gravity and acceleration. Depending upon the version of the game played, the student may have to develop these relationships in mathematical terms.

So there you have the answer. The preceding examples were not designed as educational games. Students play the games because they are fun—and learn almost in spite of themselves.

Education by Design

Of much greater learning potential are those games specifically designed for educational purposes. A well-designed simulation can be quite valuable in the learning process. A few games with learning potential are: managing a campaign in a computer-run election, planning a ship's course on the basis of ocean currents and weather reports, handling a stock portfolio on the computer exchange, and establishing and maintaining a household budget.

On a more elementary level, we may include the wide variety of story-writing programs. These require the student to enter a given number of nouns and verbs to be used in a computer-written story.

In considering education and games, we must not overlook those designed specifically for instructional purposes. An example of this type is Math Duel, which pits one student against another in answering math problems at various levels of difficulty. Another is the Space Exploration-type in which the student identifies solar bodies by their characteristics.

Are all these games fun?—sure. Do they have teaching and learning potential?—certainly! Learning sometimes may be slow but it need not be always painful. Invariably, learning can be made pleasant especially when a microcomputer is available to control a great many variables and offer an infinite number of variations.

Final Thoughts

I'll conclude this overview of games in education with three observations. First, the instructional value of a computer game is not fixed. Just as with any instructional material, it must be matched to the level, readiness, and need of the student.

Second, if one has the programming ability and the time, a game designed for one level or ability may be adapted to another.

Finally, acquiring educational games is no different from acquiring any other type of software in one respect: caveat emptor—let the buyer beware.

We know the microcomputer can provide the *potential* for more effective learning. We take advantage of its value in better meeting the needs of the students by increasing the opportunity for individualizing instruction. We realize a good microcomputer program is self-prompting, immediately reinforcing, non-threatening, level-adjusting, and endlessly patient.

We must not overlook the fact that the microcomputer can also provide game/simulation learning experiences which are all but impossible by any other method. We must take advantage of this quality by interspersing our CAI lessons and tests with well-chosen games.■

Educators—*80 Micro* is sponsoring a Young Programmer's Contest for all aspiring programmers 18 years old and younger.

Contestants will be divided into three age groups. One $300 Grand Prize, three $200 first prizes, three $100 second prizes, and three $50 third prizes will be offered. All winning entries will be published in *80 Micro*'s February 1983 educational issue.

For more information see *80 Micro*'s ad in this and coming issues.

Fame and fortune may be yours by entering:

80 Micro's Young Programmer's Contest 1982-1983

Grand Prize—$300, Plus Publication

3 1st Prizes—$200 each, Plus Publication
3 2nd Prizes—$100 each, Plus Publication
3 3rd Prizes—$50 each, Plus Publication
Honorable Mentions—Free subscription to *80 Micro* and possible publication.

If you are an aspiring programmer, 18 years or younger, enter *80 Micro*'s 1st Annual Young Programmer's Contest.
Entries may be for any TRS-80*. Programs will be judged on originality, documentation, and program elegance. The age categories are 10 years and under, 11 through 13, and 14 through 18. All entries will be judged by the *80 Micro* staff.

RULES

1. Final entries must be in by November 1.
2. All entries must be submitted on magnetic media and be accompanied by double-spaced, typewritten documentation.
3. You may submit as many entries as you like, but each must be submitted separately. Only one prize per person.
4. Entries must be original and unpublished.
5. All winning programs become the property of *80 Micro*.
6. The category in which you will be judged will be determined by your age as of November 1, 1982. You must not have turned 19 by that date.

****

The *80 Micro*
Young Programmer's Contest

Name _____ Age _____ Date of Birth _____

Street Address _____ Town _____

State/Zip _____ Machine _____

Include this form with your entry and return to:
Young Programmer's Contest
80 MICRO
73 Pine Street
Peterborough, NH 03458

*A trademark of Radio Shack, a division of Tandy Corporation

See List of Advertisers on page 338

80 Medical Opinion

by Philip R. Mills, M.D.

"I like the simplicity and clarity of the daily and monthly journals."

This month we begin with suggestions for newcomers who are investigating automation of their clinic. It is always hazardous to give opinions, but for what it's worth...

The Model 16 with two disk drives should prove to be an excellent clinic computer. The medical clinic will benefit from the extra terminals, speed and memory the Model 16 provides. Early versions are bound to have hardware bugs. Model 16 TRSDOS will probably have software bugs as well. However, other operating systems will be developed. A full version of COSTAR (computer-stored ambulatory record), an excellent computer system developed at the Massachusetts General Hospital, is almost certain to become available for this computer within a short time.

Month-end statement printing is the most time-consuming operetion the typical clinic computer performs. A printer with less speed than 200 cps is too slow for this function. A hardware spooling device is necessary. It will pay for itself by freeing the computer for other uses.

Eight-inch double-density disks provide a bare minimum of memory for patient billing systems. Most clinics will find a hard-disk drive a necessity. Radio Shack will be marketing a 50-megabyte disk drive in the neer future according to my sources. Their current 8.5 megabyte drives are adequate for billing purposes, but larger storage is needed for complete medical records. The Model II's greatest need is in the area of utility software. Programs equivalent to Model I/III Superutility, Trakcess and good diagnostic packages will find a ready market.

Medical Office System
Windham Software, Inc.
29/31 Ivanhill St.
Willimantic, CT 06226
Model II
$499

The Medical Office System is very reasonably priced and e similar Dental Office System is available for the same amount. With the purchase of this software comes a coupon which gives 10 percent off on the purchase of a Model II computer system. In many cases this coupon actually makes the software free! A fully refundable demonstration disk is available for $100 and is recommended as a trial before purchasing the entire system.

The minimum hardware requirements for this package are the Model II with two external drives and a 132-column printer.

Windham Software is a new company. The writers of the program are not new to computers, however. The major author is Tom Price. He has written several programs marketed by Radio Shack.

The Medical Office System comes with very superior packaging. The documentation is clear and well written. My secretary was able to understand the instructions without difficulty.

A very good feature was the Operator's Prompt Card. This is a cue card which details start-up, formatting and back-up instructions. It is excellent and inexperienced operators will undoubtedly appreciate this help.

The manual is printed on very thick paper (almost cardboard), and is easy to read. A comprehensive index is included. The appendix gives a sample of the major printouts. The appendix also provides complete information for ordering statement forms, and so on.

The only part in the manual which I found confusing was the Sample Charge Slip which was included under Sample Reports in the appendix. I assumed it was a printout produced by the Medical Office System. Actually it is a copy of the charge slip Dr. Hayes, one of the authors, uses in his practice. It was typed using Scripsit. I would like to see an additional section added to the documentation detailing suggestions for initial implementation of the system. It could contain suggestions for clinics changing to computers gradually, and for those changing all at once. Computerization is initially difficult, as our clinic has learned repeatedly.

The program is written in Basic. Programs ere easily enhanced by any programmer. Sorts and searches are done in machine language and are fast. PEEKs and POKEs are used freely. Break is disabled while the program is running. Several clever Basic programming features have been utilized to speed up the package, making it the finest Basic program I have seen to date for medical billing. Disks can be copied, and back-ups are encouraged.

To protect office records, passwords have been implemented. Three passwords are used. One password initializes the system, a second password gives access to the billing data. A third password, for updating the software, is used only by Windham Software and is not given to the purchaser. Although I was able to defeat the password protection in a short time, no one with merely a casual knowledge of computers could do it easily.

Setting up the data files is a time-consuming task. A full system with space for 3,500 patients (expandable to 15,000), takes nearly two hours just for the computer to allocate disk space for the patient information. Although the manual does not suggest it, keeping a copy of the blank disk produced at this time, and making back-ups of these disks each month saves more than 45 minutes during the time-consuming month-end routines.

During the original setup routines, the clinic address and physician information is entered. Entry is simple. Manual centering is possible by pressing the tab key, which moves all characters to the right. I suspect the tab key was chosen for one-key command simplicity.

When all setup chores are completed, diagnosis and procedure files are entered. The package allows a maximum of 500 procedures and 500 diagnoses to be entered. This will be adequate for most clinics. An irritation during data entry is the failure to provide the number of the last procedure or diagnosis entered. Furthermore, autometic numbering for speedy entry is not available as an option, nor is such an enhancement planned. Because string space is limited, most procedures and diagnoses must be abbreviated.

(One function that, to my knowledge, is provided on no micro medical package is

fun 'n' games

Sargon II
(Spracklens) The first great computer chess program. "This program represents a giant step forward in microcomputing Chess . . . an excellent program which will provide a true challenge for many players. We are impressed with the program's speed, its opening book, and its much improved end game . . . save your money and buy SARGON II . . ."
80 Software Critique.
#03418, TRS-80 Models I & III tape, $29.95
#03408, TRS-80 Model I Level II disk, $34.95
#03418, TRS-80 Model III disk, $34.95

Royal Flush:
Competitive Poker Solitaire
(Wazaney) Play alone or with a number of players. Arrange the 25 randomly dealt cards into the highest scoring poker hands. Choose from four possible variations—no matter how many times you play, the hands are never the same.
#07103, TRS-80 Level II tape, $14.95

Mind Thrust
(Sackson and Wazaney) Match wits with the computer! Be the first to complete a chain across the board. Switch sides at any time and control your opponent's pieces as he controls yours.
#07403, TRS-80 Level II tape, $16.95

TRS-80 Galaxy of Games
(Dilley, Savolaine, and Wilkerson)
A real bargain—and hours of fun!
Hangman—The most famous word game—you'll get hung up on it.
One-Arm Bandit—A home version of the casino slot machine.
Skunk—An exciting dice game—you get "skunked" when you roll no points.
Jacks—A card game in which small is great. Trade high cards for low ones and win!
#09903, TRS-80 Models I & III, $14.95

Blackjack Master:
A Simulator/Tutor/Game
(Wazaney) Now you can develop and evaluate a system for winning at blackjack without leaving your home and without risking a penny. Performs complex simulations and evaluations of any playing and betting strategies you enter into the computer. Tutors you in the playing of these strategies and performs an evaluation of the results.
#05303, TRS-80 Level II tape, $24.95
#05308, TRS-80 disk, $29.95

Backgammon
(Wazaney) The classic game of luck and skill, played against a preprogrammed opponent. The dice roll is controlled by you or the computer, and you can even look ahead for optional play moves.
#02503, TRS-80 Level II tape, $10.95

305

HAYDEN SOFTWARE

Order Today

Available at your local computer store or order by phone 1-800-631-0856
In New Jersey: (201) 843-0550 ext. 382

Mail to:

Dept. #EM 8214
Hayden Book Company, Inc.
50 Essex St., Rochelle Park, NJ 07862

Method of Payment

☐ Enclosed is my check or money order

Please charge to my
☐ Visa ☐ Master Card
Expiration Date:_____

Residents of NJ and CA must add sales tax.

Please send me the item(s) indicated below by code number:

Mr./Ms. _____

Address _____ Apt. # _____

City _____ State _____ Zip _____

Visa/MasterCard # _____ Exp. Date _____

Signature _____

EM82-014 A401

See List of Advertisers on page 338

LETTERQUICK

(1) Headings
(2) New Letter
(3) View Text
(4) Add Text
(5) Delete Line
(6) Change Line
(7) Insert Line
(8) Print Style
(9) DBL Space
(0) Disk Storage
(E) Envelope Address
(D) Directory

Quick & complete Small Business form & letter writer for Model I & III. Send stamped envelope for FREE info or $38 for disk

MICRO-QUICK ✓422
1417 W Busch Blvd., Tampa, FL 33612

TRISSWORD

Play the popular word search game against The TRS-80

FEATURES:
- **5 × 5 Letter Grid**
- **Up to 4 Players**
- **5 Levels of Play**
- **Computer Finds Words up to 6 Letters**

Requires 48K — Available on 5¼ Diskette — Specify Model & DOS

$19.95 ✓431

W. C. Maxey
3003 Lakeshore Drive
Deerfield Beach, Fl 33441

Scotch®
MEMOREX
Verbatim.
maxell.

Diskettes and all your media needs
Our REGULAR prices are SPECIAL

CALL FREE (800) 421-3957

C.O.D. charge cards accepted.
Excellent dealer program.

Softel

In Cal. call (209) 221-1118

1418 West Shaw Avenue
Fresno, CA 93711
Foothill of The Sierras

✓435

80 Medical Opinion

the ability to differentiate left, right or bilateral; chronic or acute; mild, moderate or severe; or distal, middle or proximal without a different diagnosis for each. For example, it should be possible to give a diagnosis of left carpal tunnel syndrome, by tacking on the extension "left" after the diagnosis "carpal tunnel syndrome" is entered. Any suggestions, programmers?)

A very helpful feature is the ability to print complete procedure and diagnosis lists in alphabetic sequence as well as numeric sequence.

When procedure and diagnostic files have been completed, the package is ready for daily billing.

Patient account number entry is similar to diagnosis and procedure entry. It also has no method of auto recording the last account number entered nor automatic patient account number incrementing. The program was designed to allow the entry of the patient's clinic number as the account number. However, this is not practical for two reasons: First, family members have different clinic numbers, but usually only one account. Second, end-of-month sorting routines are much too slow on any floppy-disk system to tolerate more than one or two patient disks for a practical maximum of 7,000 patients. With the usual busy clinic, all inactive accounts must be routinely removed from the system for maximum efficiency.

Patient account numbers can be located by patient name if desired. This is an important feature since patients commonly misplace their account numbers, and a printout of all patients is a time-consuming task.

Once patient data is entered, daily transactions are very easily entered. A needed enhancement is a running total on the screen. I wrote a simple enhancement to my own copy of the program. (Incidentally, the place to modify for the enhancement is located in MOSA on lines 2680-2780 in my version.)

A superbill is not printed, but diagnoses, procedure charges, and payments can be printed out on an AMA-approved insurance form, and this can serve as a superbill. Personally, I would modify the printout for a superbill. This has the big advantage of requiring fewer paper form changes. (The personal information portion of the insurance form is not filled out by this system.)

Editing transactions is a simple process. Although transactions can be deleted by editing, inserting a transaction requires going through the daily transaction module.

I like the simplicity and clarity of the daily and monthly journals. They are easily understood, but the daily journal should be improved by showing the balance of each account transaction. This is particularly needed because the major deficiency of this program is its failure to provide the current account balance. (This deficiency is shared with Radio Shack's Model II medical package.) My billing clerk tells me that readily available current account balances are a must. The way editing is performed on this program to provide current balances would probably require a major rewrite. It would definitely reduce the maximum number of patients allowed. It would not affect the practical limitation of patient accounts, however.

Complete statements are printed each month. A copy of the record may be printed as well. There is no option to print out a portion of the statements for billing half of the patients at mid-month, and the other half at month's end.

A number of helpful statistics are provided. Most statistics are available for the entire practice or for the individual physician as well. Here are a few highlights:

- Procedure counts and diagnosis counts are available. All diagnosis statistics are provided only for the first diagnosis entered for each patient office visit, however.
- A morbidity index is available to locate all patients with any selected primary diagnosis. For example, you can identify all patients with a primary diagnosis diabetes mellitus. This should be very helpful for research.

Early this summer several important enhancements will be available. These enhancements include an interface with Scripsit, a referring physician file, recall and eppointment scheduling, an expanded insurance file, installment billing, archiving to produce an itemized account for the entire year for income-tax purposes, and aged balances printed on statement forms. A final enhancement is a module to add interest charges to outstanding balances.

Although it is not perfect, the system is very useable, particularly when you consider the price. Video prompts are clear, the screen displays are clean and artistic. Support is excellent, and many improvements are forthcoming in response to users' requests. A year from now this program should be quite good. It is written by proven programmers and Windham Software is almost certain to be around for a long time. The company's long-term plans for a Model 16 Medical Office System for the clinic are very exciting.

If a clinic has fewer than 7,000 patients and is not considering a hard disk, the Medical Office System provides an economical software choice.

I am anxious to hear from other clinics. Any special topics you are interested in? Until next month... ■

COMPUTER BOOKS FOR BEGINNERS

Everything you need to know to get started programming your own computer. These handy books of programs and about programming are jammed with easy-to-understand info for beginners. They are crammed with hundreds of tips, tricks, secrets, hints, shortcuts and techniques plus hundreds of tested ready-to-run programs. Our full line includes program books and programming aids for eight of the most popular computers for beginners: TRS-80 Color Computer, APPLE II, IBM Personal Computer, TRS-80, Sharp and Casio pocket computers, including the new TRS-80 PC-2 and Sharp PC-1500

Color Computer

101 Color Computer Programming Tips & Tricks, learn-by-doing instructions, hints, secrets, techniques, insights, for TRS-80 Color Computer. 128 pages. $7.95

55 Color Computer Programs for Home, School & Office, practical ready-to-run software with colorful graphics. 128 pages. $9.95

55 MORE Color Computer Programs for Home, School & Office, handy book packed with useful, type-in and run software with colorful graphics for TRS-80 Color Computer. 112 pages. $9.95

Color Computer Graphics, complete guidebook loaded with tips, tricks, hints, secrets, shortcuts for making the most of TRS-80 Color Computer video graphics. Learn-by-doing instructions plus complete programs. 128 pages. $9.95

The Color Computer Songbook, 40 favorite pop, classical, folk & seasonal songs arranged for TRS-80 Color Computer, ready-to-run music programs. 96 pages. $7.95

My Buttons Are Blue and Other Love Poems from the Digital Heart of an Electronic Computer, for poetry lovers, computer lovers, and just plain lovers. 66 heartwarming poems written by a TRS-80 Color Computer. 96 pages. $4.95

APPLE Computer

101 APPLE Computer Programming Tips & Tricks, secrets, hints, short cuts, techniques, insights for APPLE I. 128 pages. $8.95

33 New APPLE Computer Programs for Home, School & Office, practical ready-to-run software for APPLE I. 96 pages. $8.95

Program Worksheets

Handy printed forms make writing BASIC software easy and fun. Customized for your own computer system, or use the universal form good for any BASIC computer. 40-sheet tablets.

Color Computer Coding Form	$2.95
Pocket Computer Coding Form	$2.95
APPLE Computer Coding Form	$2.95
IBM Personal Computer Form	$2.95
Universal Coding Form	$2.95

Pocket Computer

101 Pocket Computer Programming Tips & Tricks, secrets, hints, short cuts, techniques from a master programmer, for TRS-80 PC-2, PC-1, Sharp PC-1500, PC-1211 pocket computers. 128 pages. $7.95

Pocket Computer Programming Made Easy, new fast, easy, read-and-learn way to make TRS-80 PC-2, PC-1, Sharp PC-1500, PC-1211, Casio FX-702P pocket computers work for you. Learn BASIC quickly. 128 pages. $8.95

50 Programs in BASIC for Home, School & Office, useful, ready-to-run software for TRS-80 PC-2, PC-1, Sharp PC-1500, PC-1211 pocket computers. 96 pages. $9.95

50 MORE Programs in BASIC for Home, School & Office, book of tested type-in-and-run software for TRS-80 PC-2, PC-1, Sharp PC-1500, PC-1211 pocket computers. 96 pages. $9.95

Murder In The Mansion and Other Computer Adventures, murder mystery, space adventure, 24 games for TRS-80 PC-2, PC-1, Sharp PC-1500, PC-1211 pocket computers. 96 pages. $6.95

35 Practical Programs for the Casio Pocket Computer, useful type-in-and-run software for the FX-702P. 96 pages. $8.95

Order direct from this ad. Send check, money order, or MasterCard or VISA account number and expiration date. Include $1 shipping for each item ordered up to a maximum of $3. Or write for our free catalog. Mail to:

ARCsoft Publishers

Post Office Box 132W
Woodsboro, Maryland 21798

MasterCard (301) 663-4444 VISA

Customers outside North America wanting airmail send $4 postage per book. Foreign customers pay in U.S. dollars. Maryland residents add 5% sales tax. Sorry, no COD. TRS-80 is a trademark of Tandy Corp. Radio Shack. APPLE II is a trademark of APPLE Computer, Inc.

See List of Advertisers on page 338

80micro

READERS' CHOICE AWARDS

What's the most popular TRS-80 software on the market these days? It's a question the *80 Micro* editorial staff is asked frequently. So we decided to find out the answer, with our first annual *80 Micro* Readers' Choice Awards.

The object is simple. Read through the lists on the following pages, and pick out your favorite software packages in the categories that apply to you. Then write in the numbers of your choices on the ballot provided. Or you can write in the name if it's not on the list. Any commercial software package, past or present, is eligible.

One other thing. We know how much you hate to tear pages out of your magazine, but to avoid ballot-stuffing, we can only accept original ballots. In other words, no photocopies, please.

Oh, yes—the deadline for ballots is October 1. We'll publish the results in December.

Color Computer—Business

1. Business Analysis (Spectral Associates)
2. Check-Book (MPP Graphics)
3. Investment Analysis (Radio Shack)
4. Personal Finance (Radio Shack)
5. Spectaculator (Radio Shack)
6. Stock Portfolio Management (MPP Graphics)

Color Computer—Data Communications

1. Microfiles (Radio Shack)
2. ColorTerm (Martin Consulting)
3. Super Color Terminal (Nelson Software)

Color Computer—Disk Operating Systems

1. CCMD+9 (Cer-Comp)
2. TRSDOS (Radio Shack)

Color Computer—Education

1. Geography Pack (Spectral Associates)
2. Math Drill (Tom Mix Software)
3. Math Tutor (Custom Software Engineering)
4. Spelling Teacher (Custom Software Engineering)
5. Spelling Test (Tom Mix Software)
6. Typing Tutor (Radio Shack)
7. Word Drill (Tom Mix Software)

Color Computer—Games

1. Battlefleet (Aardvark-80)
2. Bible Quiz (Moses Software)
3. Biorhythm (Pro-Games)
4. Black Jack (MPP Graphics)
5. Black Sanctum (Mark Data)
6. Black-Jack (Pro-Games)
7. Break-the-Code (Pro-Games)
8. Brickaway (Pro-Games)
9. Casino (Tom Mix Software)
10. Cave Hunter (Mark Data)
11. Color Berserk (Mark Data)
12. Color Pak Attack (The Micro Works)
13. Connect Four (Tom Mix Software)
14. Cosmic Invaders (Spectral Associates)
15. Cosmic Patrol (Instant Software)
16. Cosmic Super Bowl (Spectral Associates)
17. Crap Table (MPP Graphics)
18. Craps (Pro-Games)
19. Dancin' Devil (Tom Mix Software)
20. Dark Castle (D.L. Dawson)
21. Death Ship (Aardvark-80)
22. El Casino (MPP Graphics)
23. Escape From Mars (Aardvark-80)
24. Ghost Gobbler (Spectral Associates)
25. Hang-Man (Pro-Games)
26. Labyrinth (Aardvark-80)
27. Laser Attack (Spectral Associates)
28. Lothar's Labyrinth (Spectral Associates)

29. Luna-Lander (Pro-Games)
30. Maze Race (Computerware)
31. Meteor Shower (Moses Software)
32. Moon Lander (Tom Mix Software)
33. Night Flight (Moses Software)
34. Photon (Moses Software)
35. Poker-dice (Pro-Games)
36. Project Nebula (Radio Shack)
37. Pyramid (Aardvark-80)
38. Quest (Aardvark-80)
39. Reflex (Pro-Games)
40. Robot Battle (Spectral Associates)
41. Roulette (Pro-Games)
42. Russian Roulette (Pro-Games)
43. Shuttle (Moses Software)
44. Silly Syntax (Sugar Software)
45. Slashball (Aardvark-80)
46. Slot Machine (MPP Graphics)
47. Slot Machine (Pro-Games)
48. Space Invaders (Space Cadet Enterprises)
49. Space Shuttle (Aardvark-80)
50. Space Traders (Spectral Associates)
51. Space Zappers (Aardvark-80)
52. Star Blaster (Micro Works)
53. Star Fighter (Aardvark-80)
54. Super Bustout (Radio Shack)
55. Tic Tac Toe (Moses Software)
56. Tic-Tac-Dragon (Pro-Games)
57. TimeTrek (Aardvark-80)
58. Trek Adventure (Aardvark-80)
59. Vampire Castle (Aardvark-80)
60. X-Ray Cube (Wonderware)

Color Computer—Utilities

1. CBUG (Micro Works)
2. CCASM-9 (Cer-Comp)
3. CCEAD (Eigen Systems)
4. CCDISS (Cer-Comp)
5. CCUTLY (Cer-Comp)
6. CocoBug (Algorix)
7. CORES9 (Cer-Comp)
8. Editor/Assembler (Micro Works)
9. Editor/Assembler (Spectral Associates)
10. Humbug (Star-Kits)
11. Magic Box (Spectral Associates)
12. ML Rabbit (Tom Mix Software)
13. Monitor Tape/ROM (Micro Works)
14. SEACS (Data Soft)
15. Sigmon (Data Soft)
16. Source Generator (Micro Works)
17. Super Monitor (Spectral Associates)
18. Text Editor (Cer-Comp)
19. TRS-MON (Cer-Comp)

Color Computer—Word Processing

1. CCEDT9 (Cer-Comp)
2. CCWriter for Disk (Transtek)
3. CDTPRO (Cer-Comp)
4. Color Scripsit (Radio Shack)
5. Super Color Writer II (Nelson Software)
6. Telewriter (Cognitec)
7. Textpro (Cer-Comp)
8. Word CC7 (DSC Products)

I/III—Accounting

1. Accounts Payable (Plus Computer Technologies)
2. Accounts Payable (D.B. Software Co.)
3. Accounts Payable (Creative Software)
4. Accounts Payable (Data Automation Services)
5. Accounts Payable System (Nepenthe Programs)
6. Accounts Payable System (Radio Shack)
7. Accounts Payable System (Data Automation Services)
8. Accounts Payable System (North American Software)
9. Accounts Receivable (Plus Computer Technologies)
10. Accounts Receivable (D.B. Software Co.)
11. Accounts Receivable (Computronics)
12. Accounts Receivable (Creative Software)
13. Accounts Receivable System (Nepenthe Programs)
14. Accounts Receivable System (North American Software)
15. Accounts Receivable System (Data Automation Services)
16. Accounts Receivable, Invoices (Taranto & Associates Inc.)
17. Accounts Receivable, Overdue Notices (FCT Inc.)
18. Business Accounting System (Computer Generated Data)
19. Cash Disbursements System (FCT Inc.)
20. Check Writer-80 (Radio Shack)
21. Client Accounting (Computer Generated Data)
22. Client Billing For CPAs (Small Business Systems)
23. Coordinated Accounting Systems (D.B. Software Co.)
24. Doughflo (Alphanetics)
25. General Contractor Costing (Data Automation Services)
26. General Ledger (Computronics)
27. General Ledger (D.B. Software Co.)
28. General Ledger (Creative Software)
29. General Ledger (Plus Computer Tech)
30. General Ledger By Department (D.B. Software Co.)
31. General Ledger System (Data Automation Services)
32. General Ledger System (North American Software)
33. Jewelry Industry Factpac (Centex Data Systems Inc.)
34. Ledgerplus Accounts Receivable (Microsource)
35. Lynn's A/R System (Lynn Computer Service)
36. Minibiz System (Nepenthe Programs)
37. Order Entry (D.B. Software Co.)
38. Property Management System (Realty Software Co.)
39. Receipts (FCT Inc.)
40. Small Billing System (Business Data Control)
41. Time and Expense System (Computer Generated Data)
42. Versa Ledger (Computronics)
43. Visaccount (All Systems Software)

I/III—Business

1. Budget Management (Radio Shack)
2. EasyTrak (Plus Computer Technologies)
3. Easy Calc (Instant Software)
4. Fixed Assets (Plus Computer Technologies)
5. Incoprop (E-Z Software)
6. MailPak (Simplified Software)
7. Mailgram (Radio Shack)
8. Market Tracker (H&H Trading)
9. Project Manager (Radio Shack)
10. Real Estate I,II,III (Radio Shack)
11. Stock Tracker (H&H Trading Co.)
12. Stock Chart (Softbyte Computers)
13. StockPak (Radio Shack)
14. System III (Contract Services Association)
15. Trendex—Stock Trend Analysis (Radio Shack)

I/III—Data Base Management

1. Aids-III (Meta Technologies)
2. Autowriter (Midwest Data)
3. Business Database System (Charles Mann & Associates)
4. Business Information System (FCT Inc.)
5. Data Ace (Computer Software Design)
6. Data Manager II (Bottom Shelf Inc.)
7. Data Organizer (CMS Inc.)
8. Database Management System (Institute for Scientific Analysis)
9. Database Manager (Micro Architect)
10. DBM-1 (Autel Electronics)
11. FORM80/DATA80 (Alpha Data)
12. INFO 80 (Bluebird's Inc.)
13. Instant Sort/Search (Acorn Software)
14. Keyed File System (KFS80) (Racet Computes)
15. Magnum Data Management (Data Resources)
16. Maxi Manager (Adventure International)
17. MicroFiles (Radio Shack)
18. Profile (Radio Shack)
19. Profile III Plus (Radio Shack)
20. Smart Terminal (Micron Inc.)
21. STERM (Howe Software)
22. VersaFile (Radio Shack)
23. Docu-Mail (Nepenthe Programs)
24. Mail List Programs (Precision Prototypes)
25. MAIL-V (Micro Architect)
26. Maillist (Racet Computes)

I/III—Data Communications

1. Autospec (Stanley Rice)
2. Autocast (Stanley Rice)
3. Connection 80 (B.T. Enterprises)
4. Forum80 (Small Business Systems)
5. Modem 80 (Alternate Source)
6. Omni-Term (Lindbergh Systems)
7. Smart Terminal (STERM) (Computronics)
8. ST80 (Small Business Systems)
9. SuperTerm (Instant Software)
10. TELCOM (Mumford Micro Systems)
11. UNITERM 80 (Apparat Inc.)
12. Videotex Communications Package (Radio Shack)

I/III—Disk Operating Systems

1. DOSPLUS (Micro Systems Software)

2. LDOS (Logical Systems)
3. MULTIDOS (Cosmopolitan Electronics)
4. NEWDOS (Apparat)
5. NEWDOS80 (Apparat)
6. WOBOS 1 (Western Operations)
7. TRSDOS (Radio Shack)

I/III—Education

1. Acid-Base Chemistry Package (Queue Inc.)
2. Atomic Structure Package (Queue Inc.)
3. CAI Package (Resource Software)
4. CAIWARE (MicroGnome)
5. CAIWARE 2-D (MicroGnome)
6. Chemistry Equilibrium Package (Queue Inc.)
7. Chemistry With Computers (Queue Inc.)
8. Conduit Biology Package (Queue Inc.)
9. Conduit Physics Package (Queue Inc.)
10. Conduit Sociology Package (Queue Inc.)
11. Diascriptive Reading (Educational Activities)
12. Educational Package (Queue Inc.)
13. Essential Math Program (Radio Shack)
14. Euclid Geometry Tutor (Radio Shack)
15. EUX (3R Software)
16. Fundamental Chemistry Skills (Queue Inc.)
17. Geography Explorer (Instant Software)
18. High School Math (Queue Inc.)
19. J&S Chemistry Package (Queue Inc.)
20. K-8 Math With Student Management (Radio Shack)
21. Language Art (Milliken Publishing)
22. Math Paks 1,2,3 (Edu-Ware)
23. Milliken Math Sequences (Milliken Publishing)
24. Redcomp Chemistry (Queue Inc.)
25. Redcomp Physics (Queue Inc.)
26. Spark-80 Math (Precision People)
27. Student Scheduling (DownEast Digital)
28. Super CAI (MicroGnome)
29. Testrite (Class 1 Systems)
30. Typing Teacher (Instant Software)

I/III—Games

1. Adventure (MicroSoft)
2. Alien Attack Force (Instant Software)
3. Alien Defense (Soft Sector)
4. Armored Patrol (Adventure International)
5. Asylum (Med Systems)
6. Attack Force (Big Five)
7. Ball Turret Gunner (Instant Software)
8. Balrog (Adventure International)
9. Battleground (Instant Software)
10. Calixto Island (Mark Data)
11. Commbat (Adventure International)
12. Conquest Of Chestwood (Adventure International)
13. Cosmic Command (Big Five)
14. Cosmic Fighter (Big Five)
15. Danger In Orbit (Instant Software)
16. Death Dreadnaught (Programmer's Guild)
17. Defense Command (Big Five)
18. Domes Of Kilgari (Programmer's Guild)
19. Dragonquest (Programmer's Guild)
20. Dunzhin (Med Systems)
21. Escape From Mars (Aardvark-80)
22. Earthquake (Adventure International)
23. Eliminator (Adventure International)
24. Everest Explorer (Acorn Software)
25. Flight Simulator (Sub LOGIC)
26. Flying Saucers (Radio Shack)
27. Forbidden City (Fantastic Software)
28. Fortress (Soft Sector Marketing)
29. Galaxy Invasion (Big Five)
30. Gauntlet (Pro-Games)
31. Ghost Town (Adventure International)
32. Golden Voyage (Adventure International)
33. House Of 30 Gables (Instant Software)
34. Haunted House (Radio Shack)
35. Hypergate (Synware)
36. Hypergate Patrol (Synware)
37. Hyperlight Patrol (Fantastic Software)
38. Invasion Force (Radio Shack)
39. Jet Fighter Pilot (Instant Software)
40. Laser Defense (Med Systems)
41. Lost Colony (Acorn)
42. Lunar Lander (Adventure International)
43. Master Reversi (Instant Software)
44. Meteor Mission (Big Five)
45. Micro Movie (Radio Shack)
46. Mission Impossible (Adventure International)
47. Missle Attack (Adventure International)
48. Morton's Fork (Adventure International)
49. Penetrator (Melbourne House)
50. Planetoids (Adventure International)
51. Pyramid (Radio Shack)
52. Pyramid Of Doom (Adventure International)
53. Quest (Aardvark-80)
54. Raaka-Tu (Radio Shack)
55. RICOCHET (Auto Simulations)
56. Robot Attack (Big Five)
57. Santa Paravia and Fiumaccio (Instant Software)
58. Sargon II (chess) (Hayden)
59. Scarfman (Cornsoft Group)
60. Scott Adams' Adventure Package (Adventure International)
61. SFINKS 3.0 Chess (Fink Software)
62. Sky Warriors (Adventure International)
63. Space Castle (Cornsoft Group)
64. Space Intruders (Adventure International)
65. Space Warp (Radio Shack)
66. Space Shuttle (Instant Software)
67. Star Fighter (Adventure International)
68. Star Trek 3.5 (Adventure International)
69. Star Trek 4.0 (Programmer's Guild)
70. Stellar Escort (Big Five)
71. Stone of Sisyphus (Adventure International)
72. Strange Odyssey (Adventure International)
73. Super Nova (Big Five)
74. Swamp War (Instant Software)
75. Temple of Apshai (Automated Simulations)
76. Time Quest (Programmer's Guild)
77. Tower of Fear (Programmer's Guild)
78. Ultra Trek (Galactic Software)
79. Voodoo Castle (Adventure International)
80. Voyage of the Valkyrie (Advanced Operating Systems)

I/III—Spelling Checkers

1. Chextext (Apparat)
2. Electric Webster (Cornucopia)
3. Grammatik (Aspen Software)
4. Proof Edit (Aspen Software)
5. Proof Reader (Aspen Software)
6. Scripsit Dictionary (Radio Shack)
7. The Word (Oasis)

I/III—Utilities

1. Abe (Interpro)
2. Calcs IV (Meta Technologies)
3. CCEAD (Eigen Systems)
4. Clone (Mumford Micro)
5. Debug (Radio Shack)
6. Discat (Racet Computes)
7. DLDIS (Instant Software)
8. DUTL (MISO/SYS 80)
9. EDAS (MISO/SYS 80)
10. Edit (Algorix)
11. EDTASM (Radio Shack)
12. Extended Built in Functions (Snappware)
13. Full Screen Editor (DCS Software)
14. Global (Relational Systems)
15. Instant Assembler (Mumford Micro Systems)
16. Irv (Programmer's Guild)
17. KBE (Alternate Source)
18. Line Printer Spooler (Racet Computes)
19. M-Zal (Computer Applications)
20. Macro-Mon (Advanced Operating Systems)
21. Mon-3 and Mon-4 (Howe)
22. Quick Fix (Powersoft)
23. Quick Pro (Future Soft)
24. Quic-n-Easi (Standard Micro Systems)
25. SDS80C (Micro Works)
26. Step 80 (Mumford Micro Systems)
27. Stretch-Super Stretch (Algorix)
28. Super Keys (Advanced Operating Systems)
29. Super Utility (Breeze/QSD)
30. Super Utility Plus (Breeze/QSD)
31. System Diagnostics (Howe)
32. System Tape Duplicator (Small Systems Design)
33. Tasmon (Alternate Source)
34. T-Bug (Radio Shack)
35. TLDIS (Instant Software)
36. TSAVE (Algorix)
37. Tutil (MISO/SYS)
38. Ultra-Mon (Interpro)
39. Ultramon (Instant Software)
40. XBE (XEDIT) (Computer Applications)
41. XBUG (Computer Applications)

I/III—Word Processing

1. Appointment Management System (Data Automation Services)
2. Client/Bas Professional List System (Computer Generated Data)
3. Copyart (Simutek)
4. Custom (FCT Inc.)

Expensive Expansion

EXPENSIVE – The *LNW System Expansion II* and built-in comes with a full 32K of 200ns RAM RS232c 20 MA current loop serial interface. That's for starters. Next, consider our heavy gauge steel case, power indicator lamp, gold-plated connectors, FR-2 glass epoxy circuit board with solder mask and silk screen legends. Then there is the parallel printer port, screen printer port, real time clock, and extra heavy duty onboard power supply with over current protection, over voltage protection and thermal shutdown. If that's not enough then there is the floppy disk controller, guaranteed operation at a 4MHz CPU speed and our 6 month warranty. Every one of these features is *STANDARD*. This is true system expansion. You get every 'expensive' feature without spending more.

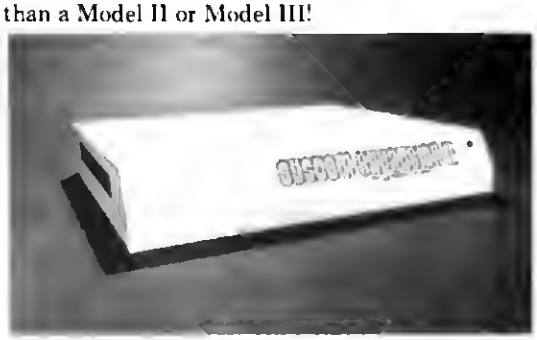
CHEAP – Our price is $399.95. Any way you compare, features or price, LNW's *System Expansion II* is the clear winner. The LNW System has been field tested for over two years with thousands of users. It works with any DOS, is 100% TRS-80 Model I compatible and it works 'right out of the box'. If there is any doubt in your mind as to whether you should buy ours or the 'other guys', just ask an LNW owner!

WE ARE #1 – Number one in price, features, reliability, performance and delivery. LNW is committed to 'expensive' features and quality at reasonable prices. LNW is committed to support, thorough documentation, and reliability. This has made us the number one manufacturer of system expansion units and accessories for the Model I computer.

EXPANSION OPTION – 8-inch drive capability is as easy as plugging in the *LNDoubler 5/8* option*. Now you can have any combination of single- or double-density, single- or double-sided, 8"* and/or 5" disks on-line! 8-inch disk storage increased to 591,360 bytes – 77-track single-sided, double-density or 1,182,720 bytes – 77-track double-density, double-sided.

The *LNDoubler's* unique 5/8 switch allows you to boot from 5- or 8-inch system disks and it's accessible from outside the interface. The $219.95 *LNDoubler 5/8* comes with a double-density disk operating system (DOS+ 3.3.9), *complete* with BASIC and utility programs... ready to run your software.

Each of your present 40-track, single-sided 5-inch drives will store up to 184,320 bytes (formatted storage) – that's an 80% increase in storage capacity for only half the cost of just one disk drive. With three 8-inch double-density, double-sided drives your Model I will have 3.75 Megabytes of online storage – that's more storage than a Model II or Model III!



LNW Research Corp.

2620 WALNUT Tustin, CA. 92680
(714) 641-8850 · (714) 544-5744

✓32

*8" drive operation requires special cable, 8 double density requires 3.55MHz CPU speed up modification or LNW 80 4MHz computer

5. Electric Pencil (Michael Shrayer)
6. Hexspell (Hexagon)
7. Home I (Business Data Control System)
8. Lazy Writer (Soft Sector Marketing)
9. Micro Proof (Cornucopia)
10. Newscript (Prosoft)
11. Qwerty (Med Systems)
12. Scriplus (Powersoft)
13. Scripsit System I/III (Radio Shack)
14. Soft Screen (Aspen Software)
15. Soft Text (Aspen Software)
16. Special Delivery (Software Concepts)
17. Super Scripsit (Radio Shack)
18. Supertxt (Bluebird's Inc.)
19. Time Manager (Radio Shack)
20. Type & File (Bluebird's Inc.)
21. Ultimail/Bas (Computer Generated Data)
22. Word Processor (Word-V) (Micro Architect)

II—Accounting

1. Accounts Payable (Plus Computer Technologies)
2. Accounts Payable Purchase (Taranto & Associates)
3. Accounts System (Micro Architect)
4. Accounts Payable (North American Software)
5. Accounts Payable (Micro Architect)
6. Accounts Payable (Magnum Computer Products)
7. Accounts Receivable (Radio Shack)
8. Accounts Receivable (Plus Computer Technologies)
9. Accounts Receivable (Magnum Computer Products)
10. Accounts Receivable (Computronics)
11. ACCT-M2 (Micro Architect)
12. Accounts Payable and Receivable System (Construction Data Control)
13. Accounts Receivable, Balance Forward (Taranto & Associates)
14. Accounts Receivable, Invoices (Taranto & Associates)
15. Client Accounting/Posting (Peach Tree)
16. General Ledger (Computronics)
17. General Ledger (Instant Software)
18. General Ledger (Magnum Computer Products)
19. Time Accounting (Radio Shack)
20. Versa Ledger (Computronics)
21. Visaccount (All Systems Software)

II—Business

1. Calc Star (Micro Pro)
2. Construction Job Costing (Micro Business)
3. Electronic Broker (Radio Shack)
4. Easy Track (Plus Computer Technologies)
5. Fixed Assets (Plus Computer Technologies)
6. General Ledger (Graham Dorion)
7. General Ledger (Plus Computer Technologies)
8. General Ledger (Systems Plus)
9. Incoprop (EZ Software)
10. Inventory (Systems Plus)
11. Inventory Control (Magnum Computer Products)
12. Inventory Control System (Radio Shack)
13. Manufacturing Invoice System (ENM Development)
14. Market Tracker (H&H Trading)
15. Micro Tax (Microcomputer Tax Systems)
16. Option Investing (Options 80)
17. Order Entry/ICS (Radio Shack)
18. Payroll II (Graham Dorian)
19. Property Management (Peach Tree)
20. Property Management Systems (Micro Computer Sales)
21. Purchase Order Entry (Systems Plus)
22. Sales Analysis (Radio Shack)
23. Statistical Analysis (Radio Shack)
24. Visi File (VisiCorp)
25. Visi Calc (VisiCorp)
26. Visidex (VisiCorp)
27. Visi Plot (VisiCorp)
28. Visi Schedule (VisiCorp)
29. Visi Trend (VisiCorp)

II—Data Base Management

1. Aids-III (Meta Technologies)
2. Business Database (Charles Mann & Associates)
3. CCA (Personal Software)
4. Condor I (Condor Computer Corp.)
5. Condor II (Condor Computer Corp.)
6. Condor III (Condor Computer Corp.)
7. Data Ace (Computer Software Design)
8. Data View (Supersoft)
9. Database Estimating (Construction Data Control)
10. Database Management (Institute for Scientific Analysis)
11. DBase II (Ashton-Tate)
12. Indexing Scheme (Software Consulting Services)
13. Keyed File System (Racet Computes)
14. Magnum Data Management (Data Resources)
15. Profile II (Radio Shack)
16. Selector IV (Micro Applications)
17. Versafile (Radio Shack)

II—Data Communications

1. Binary Synchronous Communications (Radio Shack)
2. Business Information (FCT Inc.)
3. I-TERM (Info Soft)
4. Model II Videotex (Radio Shack)
5. Reformatter (Radio Shack)
6. Smart Terminal (Small Business Systems)

II—Disk Operating Systems

1. CP/M (Digital Research)
2. TRSDOS (Radio Shack)
3. TURBODOS (Data-Rx)

II—Education

1. Testrite (Class 1 Systems)
2. Microtyping (Hayden)

II—Games

1. Hypergate (Synware)
2. Hypergate Patrol (Synware)
3. Sargon II (chess) (Hayden)

II—Medical

1. Dental Billing (Small Business Systems)
2. Dental/Medical Patient (MICRO/SYS80)
3. FMS 80 (MICRO/SYS80)
4. Hospital Records (Agricultural Systems)
5. Medical Office Systems (Radio Shack)
6. Medical Control Information (Resource Software)
7. Medical Office Management (Charles Mann & Associates)
8. Patient Data Management (Micro Computer Sales)

II—Utilities

1. Automap (Snappware)
2. Autofile (Snappware)
3. Bootstrap (Eigen Systems)
4. BOSS-II (Soft Sector Marketing)
5. CALCS-II (Meta Technologies)
6. Compress (Snappware)
7. Cross Reference Utility (Racet Computes)
8. Development Package (Racet Computes)
9. DUMP (Snappware)
10. Extended Built in Functions (Snappware)
11. EDIT-80 (Microsoft)
12. I/SAL (Infosoft)
13. Macro Assembler (Programming Innovations)
14. Mince (Mark of the Unicorn)
15. MuMATH (Microsoft)
16. Program Editor (Radio Shack)
17. Quic-n-Easi (Standard Micro Systems)
18. Reformatter (Micro Technologies)
19. Renumber (Radio Shack)
20. RSM11 (Small Systems Software)

II—Word Processing

1. Electric Pencil (Michael Shrayer)
2. Electric Webster (Cornucopia Software)
3. Magic Wand (Pickles & Trout)
4. Micro Proof (Cornucopia Software)
5. Palantir (Designer Software)
6. Perfect Writer (Computer Services Corp.)
7. Scripsit (Radio Shack)
8. Scripsit 2.0 (Radio Shack)
9. Scratch Pad (Supersoft)
10. Spell Binder (Lexisoft)
11. Spell Star (Micro Pro)
12. Super Text II (Muse)
13. Tickler File (Software Consulting)
14. Word Master (Micro Pro)
15. Word Processing II (Micro Architect)
16. Word Processing System (Construction Data Control)
17. WORD-5 (Micro Architect)
18. Word Search (Key Bits)
19. Wordstar (Micro Pro)
20. WP Daisy (Infosoft)

readers' choice

For each category, put down the number of the listed software package. If your choice is not on the list, write it in. Only one choice per category.

When you've made your selections, carefully cut this form out and mail it to: Readers' Choice Awards, *80 Micro*, Pine St., Peterborough, NH 03458.

II—Disk Operating Systems

II—Education

II—Games

II—Medical

II—Utilities

II—Word Processing

CC—Business

CC—Data Communications

CC—Disk Operating Systems

CC—Education

CC—Games

CC—Graphics

CC—Utilities

CC—Word Processing

I/III—Accounting

I/III—Business

I/III—Data Base Management

I/III—Disk Communications

I/III—Disk Operating Systems

I/III—Education

I/III—Games

Spelling Checkers

I/III—Utilities

I/III—Word Processing

II—Accounting

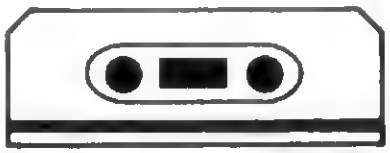
II—Business

II—Data Base Management

II—Data Communications

awards

LOAD 80 LOADS EASY



LOAD 80

ELIMINATE HOURS OF TYPING AND AGGRAVATION

LOAD 80 cassettes* for BACK ISSUES of 80 Micro now available—

In the April, 1981 issue of 80 Micro we introduced LOAD 80 to save you the time and trouble of typing our programs yourself. LOAD 80 cassette tapes contain dumps of the major program listings in 80 Micro.

If you have not yet ordered any LOAD 80 tapes and wish you had, don't worry. We are now offering a "back issue" cassette program. You can order any LOAD 80 cassette from April, 1981 to date for $9.97. Back issues of 80 Micro are also available with the LOAD 80 cassettes for $3.50. With the complete documentation found in the companion magazine issue, you should have no difficulty loading any of 80's major programs.

*Disks available from March 1982 to present

Please send me the following

	month	year		month	year
Tapes			**Magazines**		

ITEM	COST	QTY.	TOTAL
LOAD 80 Tapes add $1.50 per tape for postage and handling	$9.97		
80 Micro add $1.00 per magazine for postage and handling	$3.50		
		TOTAL	

' Check Enclosed Bill my MC AE VISA

NAME _____

ADDRESS _____

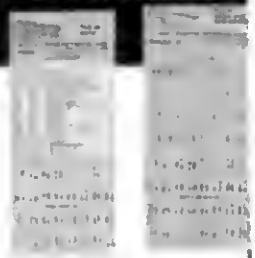
CITY _____ STATE _____ ZIP _____

CARD # _____ EXP DATE _____

SIGNATURE _____ INTERBANK # _____

Please allow 4-6 weeks for delivery.
LOAD 80 • 80 Pine Street • Peterborough NH 03458
Attn: Debra Boudreau

80micro bookshelf



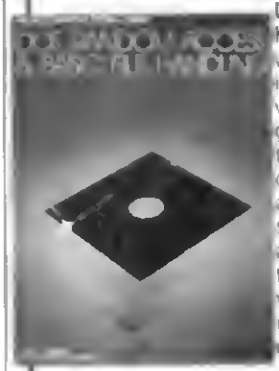
Nanos System REFERENCE CARDS

For Models I, II, III and Color

At last! No more flipping through the pages of the Basic manual! No more working through the maze of machine language instructions! These cards completely summarize the Basic and Assembler manuals! FEATURES (on most cards): memory map, eyeball graphics, math instructions, basic commands, store instructions, basic functions, load instructions, basic statements, move instructions, special keys, exchange instructions, print using examples, shift instructions, basic special characters, compare instructions, basic and assembler messages and codes, branch instructions, basic facts, data alteration instructions, reserved words, I/O instructions, ROM routines, complete character chart with graphics and space-compression codes, hex-dec chart, control code cross-reference, assembler instructions commands and operators, screen line layout, editor commands & subcommands, condition code easy access

Model I: BASIC only FC1001	$2.95
Model I: BASIC and Assembler FC1002	$4.95
Model II: BASIC and Assembler FC1005	$5.95
Model III: BASIC only FC1004	$3.95
Model III: BASIC and Assembler FC1003	$5.95
Color: BASIC and Extended FC1006	$4.95

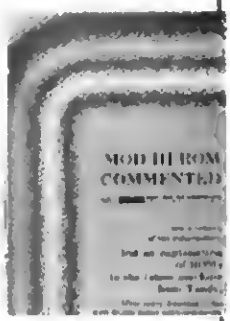
NEW!



DOS RANDOM ACCESS & BASIC FILE HANDLING—By H.J. Muller. This book was written for the nonprogrammer. It is ideal for the businessman or professional who needs to solve and write special programs for in-house business problems, or the hobbyist who wants to go beyond the cassette recorder and into disk storage and file manipulation. It is written as a self-instruction tutorial and will provide anyone with some Level II experience with the ability to write special programs for inventories, mailing list, work scheduling, record keeping, research project data manipulation, etc. 150 pages. BK1238 $29.50

NEW!

FOR THE MODEL III



MOD III ROM COMMENTED—Soft-Sector marketing, 1981. This book is not an instruction course on machine language, but rather an information source that you can use time and time again for writing your own program or patching old Mod I machine language programs. It contains an explanation of ROMs in the latest machine from Tandy, with most every location of the 14K ROMs listed, with comments. BK1235 $22.50.

Prices do not include shipping and handling charges. Please include $1.50 for first book, $1.00 each additional book and $10.00 per book foreign airmail. Sorry no COD orders. Use the order card in this magazine to order. Allow 4-6 for delivery. Shipping and handling for cards only $1.00 per order.

80 Bookshelf • Peterborough, NH 03458

1-800-258-5473

RELOAD 80

by Art Huston

Programs that go POKE in the night.

Load 80 has expanded to make room for this third annual Games Issue. We are offering two tapes and two disks this month, including everything from arcade games to card tricks.

Prices are higher this month only. The double-cassette package will cost $17.97, and the disks $29.97. Load 80 subscribers will receive the first disk or tape as usual with an option to purchase the second at reduced rates.

Move That Machine Language

Last month's RELOAD80 column began a discussion of program compatibility, or lack of it. A program designed for one machine might crash on a machine with a different memory capacity.

Having too little memory is obviously not good, but having more memory is no guarantee that a program will work correctly either. This occurs when running disks with a program designed for cassette-based systems.

Disk Basic programs load into higher memory than cassette-based Basic programs, because Disk Basic takes extra room in memory. A machine-language routine POKEd into memory locations above 31999, while above the top of a cassette Basic program, will actually overwrite the same program under Disk Basic.

Some Model I Level II programs take advantage of the free RAM in locations 16446-16511 (403EH-407FH) and 16722-16605 (4152H-41A5H). See The Freeble on page 304, December 1981 and Missiles From Mars on page 205, January 1982, which both use this technique. Disk Basic and the Model III use these addresses, so you may have to POKE the routine in elsewhere.

Here is a technique for moving the POKEs higher or lower. First, read the Key Box to see which system it was designed for. Determine the top of memory for that system and for yours. (The top of memory for 16K is 32767, for 32K 49151, and for 48K 65535.)

Now check the lines that actually POKE the routine in. Move the POKEs higher or lower depending on your system. This 16K Level II statement POKEs a routine into the top of 16K:

```
FOR ML=32700 TO 32767:READ P:
POKE ML,P:NEXT
```

Here is the same statement moved 16K higher for 32K:

```
FOR ML=49084 TO 49151:READ P:POKE
ML-65536,P:NEXT
```

and for 48K:

```
FOR ML=65468 TO 65536:READ P:POKE
ML-65536,P:NEXT
```

Note that memory locations above 32767 are expressed as that location minus 65536. Memory address 65535 is expressed as 65535 minus 65536, or negative 1. Memory address 32768 is expressed as 32768 minus 65536, or negative 32768.

Moving the machine-language routine into the correct memory location is not enough; we must tell the Basic interpreter where that routine is located. Next month's column will discuss how to do this under cassette and Disk Basic, and how to switch from cassette to disk and back. It will also include a short program to help you handle hexadecimal, decimal and addresses above 32767.■

Tape 1

Program	Title	Page	Comments
1	COPYRGHT	—	None
2	HFLYNN46	66	None
3	CUBE80	106	None
4	KALAH/SRC	132	Needs EDTASM
5	LUCKY13	156	None
6	ROUNDEND	156	None
7	STAR	156	None
8	DBLTRI	156	None
9	SLOTMACH	222	None
10	CRAM	234	None
11	MEMALPHA	254	None
12	TERMITES	274	None

Tape 2

Program	Title	Page	Comments
13	SPY	80	None
14	SPYFIELD	80	None
15	TREK1	174	None
16	TREK2	174	None
17	SUBCHOP2	216	None
18	ACROSTIC	240	None
19	KUNGFU	248	None
20	PITTYPAT	270	None
21	THRUASTR	280	None
22	LOCO	286	None
23	CARDONI2	302	None

August Load 80 Directory

NEW PRODUCTS

Edited by Steven Frann

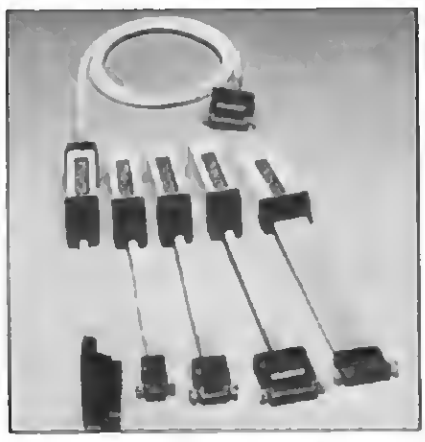
"Guns of Fort Defiance requires you to master the 'gunner's art' as practiced in the early 19th century."

Do In the Enemy

Guns of Fort Defiance puts you in command of a Napoleonic era artillery piece and its crew attempting to repel a series of attacks by infantry, cavalry or artillery. This game requires you to master the "gunner's art" as practiced in the early 19th century. As your crew goes through the steps of the actual drill involved in loading and firing, you have to determine a type of ammunition appropriate for the target, the correct fuse length for shell or spherical case, the elevation adjustment corresponding to the range for direct or rolling fire, and the deflection needed to put each shot where it will do the most good.

This fast-paced stretegy game for the Models I or III is available on cassette or disk for $20. For additional information contact Avalon Hill Microcomputer Division, 4517 Hartord Road, Baltimore, MD 21214.

Reader Service ⌐ 552



Match-Box cable system

Computer Cabling System

Match-Box enables computer and data processing equipment users to avoid long lead times when ordering customized cables for reconfigured systems or peripherals. With this product the user cen pick up two appliceble components, connect them, and simply program the cable to the computer, printer or other peripheral.

The system is built around two connectors—component A and component B. Component A is a connector with a one-foot-long section of cable attached to a Metch-Box unit. Component B has a complementary Match-Box unit attached to a cable that can be as much as 100-feet long. To use the system simply connect the two components and program it by moving the pins within the Match-Box into the correct sockets.

Depending on the number of conductors used in the cable, Match-Box prices range from $19-$53. For more information contact Ico-Rally Corp., 2578 East Bayshore Road, Palo Alto, CA 94303, (415) 856-9900.

Reader Service ⌐599

MicroMonitor Teleprocessor

You can update your present phone system with features that many PABX telephone switching systems don't offer by coupling the MicroMonitor into a telephone extension jack and monitoring all outgoing or in-coming traffic with your microcomputer. Features such as business call accounting, toll restricting, speed dialing, auto call-back, call intercepting, paging, and tone-to-pulse conversion ere easily implemented.

This product has other applications as well. Salesmen in the fleld can use it for low volume numeric data entry without resorting to a modem. You can also use it for radio telephone paging applications, as part of a message retrieval system, or as part of a dial up security system that scans fire and entry sensors thus giving your home or business edded protection.

Priced at $495, the MicroMonitor is available from MK Enterprises, 8911 Norwick Road, P.O. Box 29654, Richmond, VA 23229, (804) 740-8380.

Reader Service ⌐ 554

Tape Reproduction System

TRSDUM and TRSTUM facilitate the transfer of programs between disk and tape, disk and disk, and tape and tape. The Model III versions of these programs provide for the rewriting of existing tapes in the high speed mode. These programs read any tape or disk file that is in stan-

How to maximize your Model III:

You don't have to settle for standard equipment. Let MTI and Alpha Byte help you build the Model III you want.

MTI

MTI FLOPPY DISK ADD-ON KITS

Now you can upgrade your 16K level II Model III to a full 48K Disk System the easy way with MTI's Double Density Disk Controller and your choice of Disk Drives. You can choose 40 track, Double-Sided 40 track or Double-Sided 80 track Drives to supply your disk storage needs. Forty Track Drives store 175K. Double-sided 40 Track drives store 350K. Four Double-Sided 80 Track Drives provide up to 3 MEGABYTES of On-Line storage.

INTERNAL DISK DRIVE KITS

The first drive kit includes one Tandon Disk Drive, MTI Double Density Controller, Switching power supply, 32K of RAM, all mounting hardware, cables and Detailed Installation Instructions. The second internal drive kit includes a second drive and the necessary installation hardware.

40 TRACK DRIVE SYSTEM	
DRIVE NO. 1 K.T.	649.00
DRIVE NO. 2 K.T.	259.00
40 TRACK DUAL HEAD SYSTEM	
DRIVE NO. 1	729.00
DRIVE NO. 2	369.00
80 TRACK DUAL HEAD SYSTEM	
DRIVE NO. 1	849.00
DRIVE NO. 2	549.00

EXTERNAL DRIVE KITS

Two external drives can be attached to any dual drive Model III Computer

40 TRACK EXTERNAL DRIVES	
DRIVE NO. 3	359.00
DRIVE NO. 4	339.00
DUAL HEAD 40 TRACK EXTERNAL DRIVES	
DRIVE NO. 3	479.00
DRIVE NO. 4	459.00
DUAL HEAD 80 TRACK EXTERNAL DRIVES	
DRIVE NO. 3	659.00
DRIVE NO. 4	639.00

FIVE MEGABYTE EXTERNAL WINCHESTER HARD DRIVE. 2795.00

Add the Ultimate in Fast High Capacity Disk Storage to any Model III Floppy Disk system. Reliable Winchester technology provides enough storage for the largest business files. Winchester disk drives have greatly increased data transfer rates and that means faster program and file loading. This is a complete self contained system that connects to a standard Model III Disk System in minutes without any modification to the computer.

MODEL III DIAGNOSTIC PROGRAM. . . . 49.95

A complete diagnostic program for the Model III. Tests RAM and ROM, video display and all disk drives. Catch problems while they're small and be sure that your Model III is in perfect running condition.

MODEL III CP/M-80 NOW AVAILABLE! 799.00
CP/M® & 80 Column Kit

Now you can run proven CP/M based software on your Model III, with standard 80-column display. A simple internal modification will transform your Model III into a NEW computer and allow you to run CP/M, the industry-standard operating system and assure you of a large supply of fine software. Includes CP/M 2.2.

MODEL III SPEED-UP MOD 149.00

Now you can run your Model III at 4 MEGAHERTZ. That's almost double the standard speed. This simple-to-install kit does require some soldering. (Requires DosPlus or CP/M 2.2)

MODEL III COOLING KIT 44.95

Heat build up is a major cause of system failures and "flakey" operation. This kit provides excellent cooling.

DOSPLUS OPERATING SYSTEMS FOR THE MODEL III

Solid BUG-FREE operating systems for the Model III. Supports different size drives on the same system and Basic Program Chaining with variables saved in memory.

DOSPLUS 3.4 (40 TRACK	69.00
DOSPLUS 3.4 (80 TRACK)	119.00
DOSPLUS 4.0 (Supports Hard Disk)	129.00

CP/M is a reg. trademark of Digital Research.

Alpha Byte COMPUTER PRODUCTS

We guarantee everything for 30 days. If anything is wrong, return the item and we'll make it right. And we'll pay the shipping charges.

We accept Visa and Master Card on all orders. COD orders, up to $300.00.

Add $2.00 for standard UPS shipping and handling on orders under 50 lbs. delivered in continental U.S. Call for shipping charges over 50 lbs. Foreign, FPO and APO orders, add 15% for shipping. Californians add 6% sales tax.

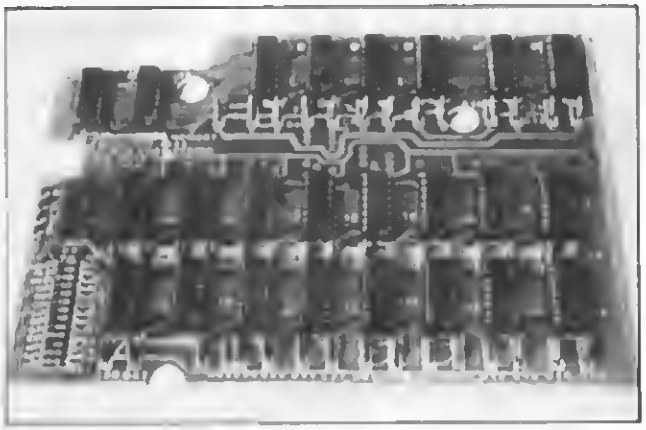
Prices quoted are for stock on hand and are subject to change without notice.

To order or for information call
(213) 706-0333
Modem order line: (213) 883-8976

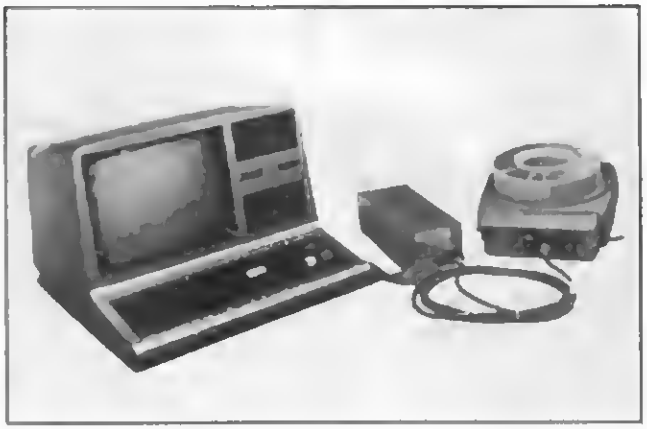
31245 LA BAYA DRIVE, WESTLAKE VILLAGE, CALIFORNIA 91362

See List of Advertisers on page 338

NEW PRODUCTS



IM-2P internal memory



Model 140-RS interface

derd TRS-80 tape or disk protocol. The program that is to be transferred is loaded into internal buffers and converted to TRS-80 standard tape protocol.

These utilities automatically identify System, Basic and EDTASM formats from disk and tape sources and will produce files of the corresponding format on either disk or tape. These utilities display the name, length and format of all programs loaded.

For single drive Model I users, these utilities facilitate single disk drive copies of machine-language programs without the need for backup.

These utilities are implemented in high-speed machine language, are menu-driven, and provide full status displays at all times. They cannot defeat passwords on disk files or custom loaders on tapes.

TRSDUM, for 16K and larger disk systems with TRSDOS 2.3 or 1.3, is supplied on disk for $17.95. TRSTUM, for 16K tape-based systems, is supplied on cassette for $16.95. For more information contact CRB Microtools, 14835 N. First Ave., Phoenix, AZ 85023, (602) 993-3999.

Reader Service ↙ 555

Data Systems Security

Datalock I, a data system security device, prevents intruders from entering your data base system. This device features an encoding technique programmeble by the dete center meneger, a date rate switch selectable to 9600 BPS, switch selectable word length, parity and stop bits, and standard EIA RS232-C connections.

Priced at $399 per unit, it is available from Terminal Brokers, 4265 Marina City Drive #411, Marina del Rey, CA 90291, (213) 822-3900.

Reader Service ↙ 591

Memory Expansion Without an Interface

The Internal Memory (IM) by Holmes Engineering expands your computer's memory capacity up to 48K without an expansion interfece. The IM plugs into the RAM sockets inside the keyboard for easy installation without modifications. The unit runs reliably at high speeds, avoids reboots and data losses found in many memory systems, and does not overload power supplies.

This system comes in three models: the IM-1 ($86) for the Model I, the IM-2 ($139.50) for the Models I and III, and the IM-2P ($139.50) for the PMC-80/81. All kits upgrade your system from 16K to 48K. For more information contact Holmes Engineering, 3555 South 3200 West, Salt Lake City, UT 84119, (801) 967-2324.

Reader Service ↙ 564

Control a Random Access Projector

The Model 140-RS Interface drives a random access slide projector such as the Kodak RA-960 or Mest 137-S4 through the RS-232C port of your computer. Baud rate is 150-4800, field adjustable. The factory set level is 1200. Standard connectors are provided. Minimum memory and programming are required for the computer to control all functions of the projector including on/off and random slide retrievel. Any of 81 slides can be projected individually within 3.5 seconds. Average search for a selected slide is 1.5 seconds.

You can use the computer/random access projector system for programmable audio-visual presentations and interactive learning. You can easily create branching teaching programs using existing slide media.

The Model 140-RS Interface ($600) and random access projectors are available from Mast Development Co., 2212 E. 12th St., Davenport, IA 52803, (319) 326-0141.

Reader Service ↙ 557

Uninterruptible Power Supply System

The Series 2000 is a new line of small uninterruptible power supply (UPS) systems that provide low cost, full UPS protection.

The Series 2000 features a pre-assembled, pre-wired battery cabinet that combines with inverter and rectifier/charger cabinets to provide a compact system capable of being placed right in the computer room. A digitally-synthesized waveform offers faster response, better control and lower harmonic content on the output of the system.

The front panel with keyboard pushbuttons features independent LED displays for such conditions as circuit breaker status, individual power circuit status, rectifier on-off and inverter on-off.

The Series 2000 is available in 10 ratings from 5-30kW and 30 ratings from 15-45kW. For more information contact Exide Electronics, 2 Penn Center Plaza, Philadelphia, PA 19102, (215) 422-4015.

Reader Service ↙ 553

Color Computer Expansion Unit

The Color Computer Expansion Unit increases RAM to 64K, providing 61.5K of user RAM, continuous from zero. It includes a Z80A microprocessor which, along with the Color Computer's 6809 microprocessor, runs CP/M, FLEX and OS-9

Color Computer expansion unit

Cotton gin software

programs. The user can select via software between the Color Computer's built-in display and an 80 by 25 alphanumeric display, with reverse video, dual intensity, blinking/blanking, inverted and protected characters. A dual-density 5¼-inch disk controller supports four drives with up to 800K per disk for a total storage capacity of 3.2 megabytes.

Additional features include a Color Computer compatible RS-232 serial port, an optional IEEE-488/1980 controller for interfacing with numerous peripherals and laboratory instruments, an optional light pen, and two expansion busses for the addition of external circuitry. A built-in audio driver and speaker allow Color Computer audio output.

The unit plugs into the Color Computer cartridge port with no modification necessary and easily unplugs allowing stand-alone use of the Color Computer. Priced at $1585 without the IEEE controller and $1750 with the IEEE controller, it is available from George Associates, P.O. Box 960, Berkeley, CA 94701, (415) 843-3587.

Reader Service ⌐ 563

Cotton Gin Software

Agri-Computer Services enhanced cotton gin software package files and accumulates information concerning individual bales of cotton. You can file the following information: gin bale number, warehouse bale number, gin weight, warehouse weight, owner's name and I.D. number, ASCS farm number, field number, price of seed, price of lint, grade and more. You can delete any of this information if it is not needed.

Using the filed bale data, the system will print various reports including ginning ticket, seed and ginning settlement sheets for gin customers, ASCS yield reports, bale ledger, daily gin summary, year to date gin summary, and others.

The program is available for the Models I, II, III, and 16. Agri-Computer Services will customize the program to the customer's operation. For additional information contact Summerville Enterprises, Agri-Computer Services, 104 Broad St., S.E., Aliceville, AL 35442, (205) 373-6383.

Reader Service ⌐ 590

Doughflo

Doughflo aids home or business bookkeeping, tax preparation, cash flow analysis, and financial planning. The system feetures ease of data entry and can process large amounts of data (800 entries in memory with 48K machines). It yields many types of financial reports including grand totals, expenses as percent of total income or total expenses.

Entries can be made in any order while Doughflo organizes them by date, vendor code, name description, date of transaction, category or check/receipt number with fast machine language sorts. It automatically provides up to eight income accounts and 33 possible expense categories to group entries.

The package includes a summary subprogram that allows you to store the results of calculations in up to 24 files which are then available in any selected order. These stored results are available for automatic comparison to budget, each other or to averages.

The package requires a 32K or 48K, Model I or III. Priced at $98.95, it comes with detailed instructions and sample data files. For additional information contact Alphanetics, P.O. Box 597, Forestville, CA 95436, (707) 887-7237.

Reader Service ⌐ 551

SuperSpooler

SuperSpooler is an intelligent printer interface. In addition to being a hardware buffer, many software-selectable formatting features are accessible with a simple Basic program.

The base model ($349) includes a 16K byte memory and Centronics compatible I/O ports. Other standard features include a self-contained power supply, two digit LED display showing the amount of data stored in the buffer, and a brushed aluminum cabinet. Options include memory expansion to 62K ($159) and RS-232 serial I/O ports ($95) that can also be used for modem transmission and serial to parallel translation.

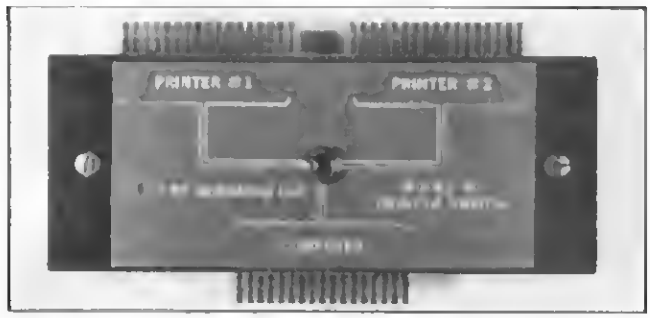
For additional information contact Compulink Corp., 1840 Industrial Circle, Longmont, CO 80501, (800) 525-6705.

Reader Service ⌐ 567

SuperSpooler

NEW PRODUCTS

TA208A/B data modem



Model 80 printer switch

TA208A/B 4800 BPS Data Modem

The TA208A/B is an LSI (Large Scale Integration) Bell compatible 4800 bits per second data modem. You can configure it, as a switch selectable option, for two-wire DDD switched network operation (B mode) or four-wire private line operation (A mode).

Six pushbutton switches used in conjunction with eight LED visual indicators, located on the front panel, enable rapid isolation of a data communications system malfunction. Test features include analog loopback, digital loopback, and local end-to-end self testing.

The TA208A/B is compatible with Bell 208A and 208B, and Rixon T208A, T208B, and T208A/B data modems. It is available as a stand-alone desktop unit ($1895) or as a card modem ($1695). For additional information contact Rixon Inc., 2120 Industrial Parkway, Silver Spring, MD 20904, (301) 622-2121

Reader Service ↙ 596

Line Printer Switch

The Model 80 Line Printer Switch for the Models I and III allow you to have two separate line printers on line at all times. Selection of a printer is by means of a conveniently located switch, without changing interconnecting cables. The switch is a compact module that connects to the printer port of your Model I or III and provides an edge connector for each of your printers eliminating plugging and unplugging printer cables.

Priced at $55, it is available from HF Signalling Inc., P.O. Box 17510, Kansas City, MO 64130, (816) 931-4448.

Reader Service ↙ 574

Software Generates Unique Character Fonts

CHARGEN generates three different sizes of Script, Olde English, and Roman Bold characters on an Anadex DP-9000 series printer. This utility program can be used with existing word processing software for TRS-80 computers.

In operation you use the word processing program to generate a text file and then store it on disk. Then call CHARGEN. By selecting the appropriate print parameters, the printout is produced in the desired character font.

The program is written in machine language and requires at least 32K RAM and one disk drive. For more information on CHARGEN contact Joe King, 7342 Capistrano Ave., Canoga Park, CA 91307.

Reader Service ↙ 594

Stedi-Watt, Jr.

The Stedi-Watt, Jr. Model 718 offers immunity from the more complex causes of unwanted signals and electrical interferance in computers and other sensitive circuitry. It features a seven-stage transient voltage and an RFI/EMI filter network and offers dual protection of 50 joules on both transverse and common modes.

Just plug it into a three-wire grounded 120 VAC outlet and turn on the lighted power switch. It includes a 15 amp circuit breaker and a green LED indicates all stages are functioning. It is ideal for hospitals, factories, lab technicians and other professionals.

Priced at $189.50, it is available from National Field Sales Inc., 2660 West Chester Pike, Broomall, PA 19008, (800) 543-3000 ext. 3443.

Reader Service ↙ 581

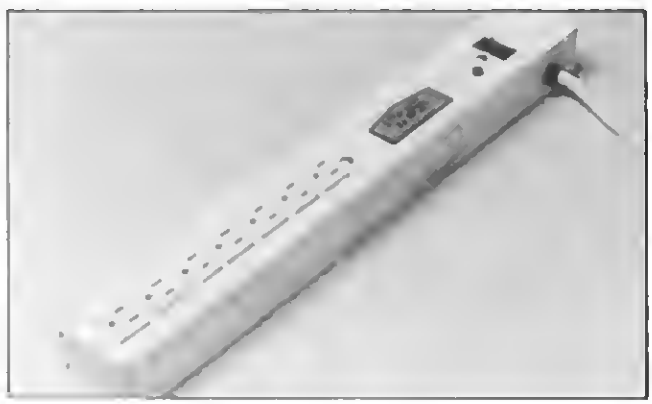
A friend is one
To whom one may pour
Out all the contents
Of ones heart,
Chaff and grain together
Knowing that the
Gentlest of hands
Will take and sift it,
Keep what is worth keeping
And with a breath of kindness
Blow the rest away.

- ARABIAN PROVERB

A friend is one
To whom one may pour
Out all the contents
Of ones heart,
Chaff and grain together
Knowing that the
Gentlest of hands
Will take and sift it
Keep what is worth keeping
And with a breath of kindness
Blow the rest away.

- ARABIAN PROVERB

CHARGEN print samples



Stedi-Watt, Jr.

M-ZAL™

Release Two Is Here!

Our Users asked for it, and we made the best TRS-80 disk assembler even better! Now M-ZAL has:

- Recursive MACROS with full symbolic parameter substitution
- Conditional assembly with unlimited nesting
- Text Editor warm-start/recovery option
- Support for all popular source file formats
- Load Module inspect/superzap using LINKER

and the features that made it famous:

- True multi-pass assembly
- Full Screen Option Menus
- ENTRY/EXTERN symbols, relocation, and object module linking
- 8 character labels with sorted symbol table
- Built-in symbol table cross-reference
- Nested *INCLUDES (source file chaining/nesting)
- Lower case support (Model 3 only)
- Over 175 pages of documentation including Z-80 Technical Manual
- Full Screen Text Editing and much, much more!

M-ZAL provides a modular, structured development environment that makes programming your TRS-80 a truly enjoyable experience. Order yours today. (Requires 32k, 2 disk system)

#1050-10	Mod 1	$149.00
#1250-10	Mod 3	$149.00

"We've been using M-ZAL heavily for over two months now, and it's been worth its weight in gold."
—Chuck Tesler
PROSOFT

"...well written software that is long overdue."
—Bruce Douglass
80 Microcomputing
BASIC Editor Review

"During the first 3 days of use, M-ZAL saved more money in programmers time than we had paid for the product."
—William Denman
Author of Asylum
MED SYSTEMS

"The editor has at least doubled my productive capacity...Having spent a good deal of money on so called 'utilities' that don't work, it's a delight to find one that not only lives up to its claims but surpasses the advertising."
—BASIC Editor user

Our choice for the best TRS-80 DOS:		
DOSPLUS 3.4	Mod 1	$149.00
DOSPLUS 3.4	Mod 3	$149.00

CAU Development Software— The Professionals Choice:

Full Screen Text Editor for BASIC: we were the first to give the TRS-80 this indispensable ability! A must for every BASIC programmer:

#1010-20	Mod 1	$24.95
#1210-20	Mod 3	$29.95

T-ZAL: custom designed for the Model 3, this tape based assembler has many of M-ZAL's most desired features.

#1250-20	Mod 3 only	$49.95

XBUG: for machine language analysis and debugging—this tiny (2.5k) but powerful program lets you do it all!

#1020-10	Mod 1	$19.95
#1220-10	Mod 3	$19.95

FILEXFER: transfer any disk file between two TRS-80s. Use direct cable link or RS modems. Mod 1 and Mod 3 can be mixed. RS-232 and disk reqd.

#1040-10	Mod 1 and 3	$49.95

Call or write for more information.
All products require level II.
Mail orders specify catalog #.
Send check, money order, or MC/VISA numbers and expiration date to:

Computer Applications Unlimited
P.O. Box 214, Dept. ABM Rye, New York 10580
(914) 937 6286

N.Y. State residents add applicable sales tax.
Outside USA and Canada add $7.00 shipping.
Dealer Inquiries Invited.

MasterCard VISA

CAU™ COMPUTER APPLICATIONS UNLIMITED™
a div. of CAU, Inc.

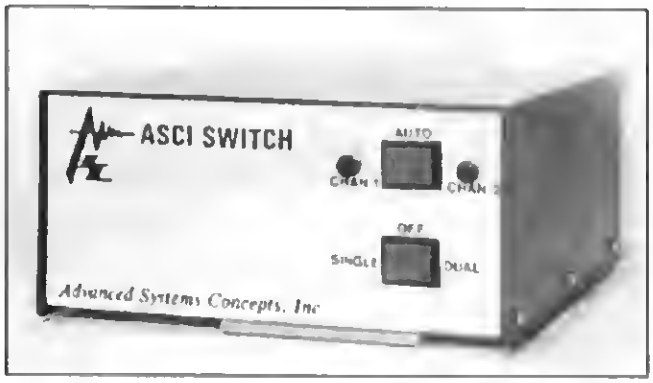
120

TRS-80 is a TM of Tandy Corp. M-ZAL is a TM of CAU, Inc
Z-80 is a TM of Zilog, Inc.

See List of Advertisers on page 338

NEW PRODUCTS

Devoke Data Products' copper garland



ASCI switch

Copper Garlands Cut Printer Static

Devoke Data Products' tinsel-like garlands safely dissipate static generated by computer printers. Copper threads are woven into a base wire that hooks onto the printer housing and is held taut by springs at each end. As paper passes over the assembly, static is drained off so output paper stacks neatly. Gerlands are 16-inches wide, with width adjustment made possible by repositioning mounting hooks. The units are available in packages of four garlands for $15.95. For more information contact Devoke Data Products, 3780 Fabian Way, Palo Alto, CA 94303, (415) 494-7511.

Reader Service ↙ 585

Construction Cost Management System

The Construction Cost Management System consists of job costing integrated with accounts payable, payroll and general ledger. The system accumulates costs by job and cost type and job phase and reports on those costs as compared to established budgets. Projected total costs may be determined either by percentage of completion or by units completed.

Job Cost reports include: job master listing, cost summary report, cost analysis by percent complete, cost analysis by units completed, labor cost report and month to date history report.

The accounts payable and payroll modules pass cost transactions to the job cost system as well as printing checks and providing basic accounting reports. Both modules provide automatic updating of the general ledger which prints standard financial reports.

The system runs on a Model III (or Model I with double density and the DOSPLUS operating system) with full memory and two standard disk drives. Larger disk configurations are supported including the hard disk for the Model III (with DOSPLUS 4.0).

The complete system is priced at $575, with the Job Cost alone priced at $350 and each accounting module $75 each. For additional information contact D.B. Software Co., 11840 NE Brazee, Portland, OR 97220, (503) 255-7735.

Reader Service ↙ 568

Lose Your Shirt and Walk Away Smiling

With an initial $5,000 you and your friends can speculate in shares of nine different corporations, or salt some of your money away in safe municipal bonds. Will you opt for slow but steady capital appreciation and the secure dividends of a public utility or mutual fund, or go for more spectacular growth (and a greater risk of loss) in the glamour industries of autos and real estate development? Perhaps the plunger in you craves the wild roller coaster of oil and uranium stocks? Whatever you choose, Computer Stocks and Bonds for the Models I and III stands ready as your loyal and unassuming broker.

This game allows you and up to three other players to summon stock analysis charts displaying not only the price history of the stock, but also detailed information on each player's performance with that company.

Priced at $20, it is available on disk or cassette from Avalon Hill Microcomputer Division, 4517 Harford Road, Baltimore, MD 21214.

Reader Service ↙ 565

Software Controllable Device For Computer Switching

The ASCI Switch allows users to have software controllable switching between any two peripherals using one computer port, or allows two computers to share the same peripheral by software switching of the peripheral between them.

Input and output ports of the ASCI Switch can be controlled by sending one of 128 user-selectable ASCII codes. The control code and baud rate are user selectable via switches located on the rear of the unit. In addition, there is no need for extra cabling or computer cards. The switch can be controlled by either data terminal equipment (DTE) or date communications equipment (DCE) without the need for a null modem.

The ASCI switch comes in two models. Model A10 switches 10 lines and Model A25 switches 24 lines of the RS-232 serial interface. The unit weighs two pounds and comes in a 3 by 5 by 7-inch metal enclosure. It can be powered by battery or an ac adapter. Priced at $295 for the A10 and $345 for the A25 it is available from Advanced Systems Concepts, P.O. Box O, Altadena, CA 91001, (213) 684-5461.

Reader Service ↙ 573

Medical Office Manager

Medical Office Management I is a package for small medical office practice management. The latest version of the package allows use of a greater number of office procedures, a greater number of active insurance companies, and the use of up to four disk drives to increase the system's capacity and speed.

The package supports appointment scheduling, private patient billing, and

third party universal claims form preparation. The menu driven package comes with a new training and operations manual.

The system is for use with the Models I or III, requires 2-4 disk drives, 48K of memory, and a 130-column printer. It will operate on TRSDOS, NEWDOS or LDOS. The package is available from Charles Mann and Associates dealers for $795.95. A preview manual may be purchased separately for $50.

For additional information and dealer locations contact Charles Mann and Associates, Microcomputer Division, 55722 Santa Fe Trail, Yucca Valley, CA 92284, (714) 365-9718.

Reader Service ↙ 589

AMORT/BAS Produces Loan Schedule

The AMORT/BAS Loan amortization program for Model I and III computers with disk drives, minimum 32K RAM, and a printer computes the monthly loan payment given the loan amount, annual interest rate, and the term of the loan in months.

This product produces a loan schedule providing each month's payment number, interest payment, principal payment, loan balance, and fields for recording the date paid and check number of the payment. It prints subtotals for every year/part of year, giving the total interest, principal, and loan balance at the year end. After the monthly data is printed, a summary prints the total interest, total principal, the sum of the principal and interest, and the amount of the last payment.

Flashing cursors and operator prompts guide the operator through the program. One-key command entries and protected inputs eliminate operator error.

AMORT/BAS is supplied on a Model I TRSDOS 2.3 formatted disk and is priced at $34.95. For additional information contact Computer Generated Date, 5541 Parliament Drive, Virginia Beach, VA 23462, (804) 497-1165.

Reader Service ↙ 587

Procopy

Procopy is a fast disk-copy utility for the Model II which allows mess producing disks or backups. Each copy is a mirror image of the source disk and can be made in about 30 seconds on a preformatted disk. You can format and copy to a non-formatted disk in about 55 seconds. The verify option adds an additional 15 seconds.

Procopy works with from one to four disk drives and with most format versions. It requires all of memory from 2800H-E500H for its program and storage. It comes on a protected version 2.0 data disk and is executed from DOS Ready. Priced at $10, it is available from Pro-80 Systems, 3206 Center St., Cedar Falls, IA 50613, (319) 266-4262.

Reader Service ↙ 566

Dairy Diary

Dairy Diary is a dairy management package written by F.B.S. Systems Inc. that is designed to supplement DHIA records. This flexible program lets you input by code approximately 60 entries per animal per disk (200 animals/disk on the Model I and 300 on the Model III). The operator may add specific activity codes. This system produces reports on individual cow records; herd status and inventory; lists of lactating, dry, freshening, anticipated heat; and special reports on bulls and heifers.

The Model I and III versions require 48K and three or two disk drives respectively and are priced at $795. For additional information contact Paul P. Gutelius, Marathon Microsystems Inc., 2610 Grant St., Evanston, IL 60201, (312) 864-6289.

Reader Service ↙ 570

LemonAid Loader

An updated version of Lemons Tech Services' LemonAid Loader for improving Model I and low-speed Model III cassette loads is now available. The new model has a quick set-up switch for pre-recorded tapes and a separate loud output jack with screwdriver volume adjust. By plugging in an external speaker, audible monitoring of saves/loads and for pre-positioning tape is automatic. Game and other sound can be heard at room level without using a separate amplifier. Power is supplied automatically. The device is for use with Radio Shack CTR-80 or 80A, and other similar recorders.

The device retains all other features of the original LemonAid Loader. The new loader (model LLQ) is priced at $18.99. For more information contact Lemons Tech Services, 325 N. Hwy 65, P.O. Drawer 429, Buffalo, MO 85622, (417) 345-7643.

Reader Service ↙ 550

AUTHORIZED VR DATA DEALERS

St.	City	Dealer
AL	Birmingham	J. H. Snow Co.
AR	Hot Springs	Microcomputer Systems
AR	Rogers	Computer Place, Inc
AZ	Tucson	Simutek Computer Products, Inc
CA	Chino	Good-Lyddon Data Systems
CA	Oceanside	OK Electronics
CA	Pacific Palisades	Computer Management Consultants Inc.
CA	San Gabriel	MICRODOC
CA	Santa Clara	Desmar Electronics
CA	Santa Clara	B&C Compuvision
CA	Torrance	Booth Electronics
CA	Walnut	Computer Valley
CT	Bridgeport	Connecticut Information Systems Co
CT	Danbury	Computer Services of Danbury
CT	Windsor	Command Performance
FL	Titusville	Computech
FL	Milton	Perry's Computer System
FL	Winter Garden	All Systems Go
FL	West Palm Beach	Computer Room
IA	Sioux City	Bytes and Nails
ID	Boise	Office Magic Computers
ID	Buhl	Idaho Microcomputers
IL	Decatur	DDS Computer, Inc.
IN	Decatur	Solid-State Electronics/Radio Shack
IN	Bloomington	T A S C I, Inc
IA	Carroll	Wilkins Computer Service
KS	Chanute	Lopeman Lectronics
KS	Colby	T&W Electronics
MA	Tewksbury	Omnitek
MD	W. Hyattsville	Microcomputer Business Systems
MD	Baltimore	Microcomputer Business Services
MI	Milan	C&S Electronics
MN	Fergus Falls	Bob Fritz Electronics
NC	Hickory	Simplified Software
NE	Columbus	Columbus TV & Electronics
NH	Portsmouth	Portsmouth Computer Center
NJ	Three Bridges	Video Selection
NJ	Marlton	LCC Engineering
NY	Ashville	Wilson Typewriter Service
NY	Elmsford	We Are Computers
NY	Lewiston	Mufflerman
NY	Woodhaven	Alpha Products
NY	Endicott	J&A Services
OH	Akron	Feldman Enterprises
OH	Wadsworth	Digital Business Machines
OK	Watonga	Sounds, Etc.
OK	Tonkawa	Micro-Com Systems
OR	John Day	Magic Enterprises, Inc
PA	Bellefonte	Capparella Bros., Inc
PA	Maple Glen	EZR Micro
PA	New Brighton	Computer Analysts
PA	Pittsburgh	Blackwater Leasing Systems
SD	Mitchell	American Compu-Products
TN	Smyrna	Delker Electronics, Inc.
TN	Tullahoma	John Turnley
TX	Houston	Gary Mee & Co
UT	Salt Lake City	Lizcon Trading
VA	Hampton	Doctor Bertram Brown Computer Systems
VA	McLean	The Creative Group, Inc
VA	North	Blackwater Leasing Systems

Foreign Dealers:

Australia, Port Adelaide—Computer Imports
Canada, Cornwall (Ontario)—Heiko Automated Products
Columbia, Cali—Microcomp del Occidente
Indonesia, Jakarta—Data Atlas
Italy, Florence—All 2000 Computer Systems
Philippines, Cebu City—Basic Instruments Phil, Inc
South Africa, Durban—Braum Business Machines
South Africa, Johannesburg—Peter's Computer Discounts
West Germany, Dusseldorf—Uwe Markus Computer Systems
West Germany, Steinfurt—Fuessner Computer Systems
Singapore—Threshold Technology

If you don't see an Authorized VR Data dealer in your area, visit your local computer store and tell him to become one!

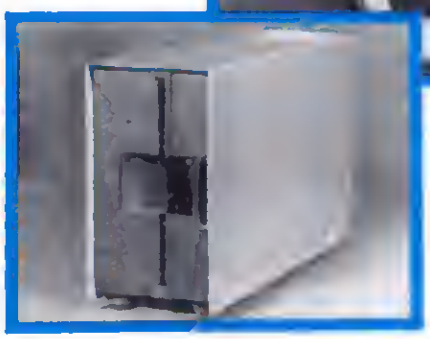
SPECIAL

TRS-80™ MOD III
48K—2 Drive—DISK III
TRSDOS & Manuals

$1882.

6.3 to 38 Meg
Winchester External
Hard Disk III
beginning at

$3195.



External Floppies
for MOD I or III
Fully compatible, 120 day warranty

$275.

80 TK or 2 sided **$419.**

80 TK & 2 sided **$549.**

Optional HD III:

9.5 meg	$3695.
19 meg	4295.
2 x 6.3 meg	4695.
2 x 9.5 meg	5395.
2 x 19 meg	6795.

CHECK THESE GREAT BUYS ON OTHER PRODUCTS:

Epson MX-80 w/graphtrax	$475.00	OKIDATA Microline 80	359.00	Verbatim 5¼" Diskettes	26.90
Epson MX-80 It	575.00	OKIDATA Microline 82A	529.00	Maxell 5¼" Diskettes	39.00
Epson MX-100	750.00	OKIDATA Microline 83A	799.00	Nashua 8" Diskettes	42.95
MX-80 Ribbons	12.50	OKIDATA Tractor	75.00	Drive Extender Cable	12.00
MX-100 Ribbons	30.00	Lexicon Modem	125.00	Head Cleaning Kit 5¼"	14.95
Epson Graphtrax	75.00	Novation Cat Modem	175.00	Disk & Other Mysteries Book	19.95
C.ITOH F-10 40 cps	1,695.00	Novation D Cat Modem	199.00	Basic & Other Mysteries Book	27.50
Tractor	200.00	Percom Doubler II	169.00	NEC Ribbons (Min. 6)	5.95
C.ITOH & Diablo Ribbons	5.95	Percom Data Separator	29.95	Printer Cable	25.00
DC Hayes Smart Modem	259.00	Paper 9½ x 11 (Fanfold)	29.95	LDOS Operating Sys.	129.00
DC Hayes Micro Modem II	339.00	Paper 14⅞ x 11 (Green Bar)	34.95	DOSPLUS Operating Sys.	149.00

NOW OPEN—VR DATA COMPUTER CENTER 616 Baltimore Pike, Springfield, Pa. (Delaware County)

PURCHASE

✱ INTRODUCTORY OFFER

Smith Corona TP-I Letter Quality Printers

- National Service Organization
- 90 day warranty thru VR DATA
- 12 cps—Daisy Wheel—10/12 CPI
- 6 Type Faces available
- UP to 5 Part Paper
- Tractor Optional

Reg. 895.

SALE $775.

OFFER EXPIRES AUG. 31st.

DISK III

100% Compatible Floppy Disks

Disk III Single Drive	**$599.**
Disk III Dual Drives	864.00
Disk III No Drives	435.00
TRSDOS & Manual	21.90
DOS PLUS & Manual	149.00
LDOS & Manual	129.00

2 Sided or 80 Track Drives add $120. ea.
2 Sided & 80 Track Drives add $240. ea.

MODEL III COMMUNICATIONS

VR-RS232
$90.

Direct Replacement For R.S. RS232, Fully Tested & Burned-In, Easy Installation, 120 Day Warranty, Programmable Pinout, Prototype Area

D-CON
$299.

Integral Modem, NEEDS NO RS232—Direct Connect, Programmable Dialing, AUTO ANSWER/ ORIGINATE, Easy Installation

IF YOU DON'T SEE IT ADVERTISED CALL US AND ASK FOR IT.

MasterCard VISA

VR data

777 Henderson Boulevard N-6
Folcroft, PA 19032 (215) 461-5300

Call Toll-Free
800-345-8102

ALL VR DATA PRODUCTS CARRY A 120-DAY WARRANTY INCLUDING PARTS & LABOR

Published prices reflect cash discount. All prices are subject to change without notice. TRS-80 and TRSDOS are trademarks of Tandy Corp. DISK III is a trademark of VR Data Corp.

8:30AM-7PM E.S.T. Mon.-Fri., Sat. 10AM-3PM
CABLE "VRDATA" TELEX 845-124

NEW PRODUCTS

MVP printer

MVP Printer

The MVP selectable-mode printer offers three operator and computer-selectable print modes, or speeds. The dot density corresponding to each mode tailors the MVP for printing applications required in small office/multi-task operations, distributed data networks, and heavy-duty industrial uses.

Print speeds are 80 lines per minute (100 by 100 dots per inch) for correspondence and word processing applications; 150 lines per minute (60 by 72 dpi) for data processing output; and 200 lines per minute (66.7 by 66.7 dpi) for compressed character printing on reduced printout format.

The MVP's self-driven shuttle mechanism integrates a linear motor into the assembly assuring office quiet operation in a desktop size.

Its printing capabilities include six-part forms, business graphics, plotting, forms generation, lebeling, OCR and bar codes. Other standard feetures are double-height printing, character printing, underlining, and electronic verticel formatting.

MVP options provide special and expanded character sets, multi-language output capability, a manual forms length selector, end an RS-232C interfece. A printer pedestal, front entry paper feed, and a paper collecting basket also are offered.

For more information contact Printronix Inc., P.O. Box 19559, Irvine, CA 92713 (714) 549-7700.

Reader Service ↙ 562

Dental Practice Office Manager

The Dental Office Management application for the Model II handles appointment scheduling, claims form management and accounts receivable of a small to medium sized dental office. The system handles either single practitioners or small group clinics.

The appointment and registration elements work together to easily enter new patients and schedule appointments for old and new patients in real time and features an automatic patient recall system.

The system includes a full accounts receivable system allowing for the preparation of daily practice management reports and transactions reports. Monthly statements are prepared automatically with full aged accounts reporting and special collections management elements.

The package requires a 84K Model II with et least two disk drives and a 130-column printer. It operates under TRSDOS or any TRSDOS compatible operating system. Priced at $1,295.95, it is available from Charles Mann and Associates, Microcomputer Division, 55722 Santa Fe Trail, Yucca Valley, CA 92284, (714) 385-9718.

Reader Service ↙ 588

Linear Programming

LP-Disk solves any lineer programming problem with up to 50 variables and 50 constraints (maximize, minimize, less than, greeter than, or equal to). The simplex algorithm is in machine language for fast calculation.

The program supports full disk I/O features including save the problem on disk, change the problem data and save the last tebleau on disk. It offers optional printing of the problem data end the tableaus. All printed output is in a readable format. The solution includes sensitivity analysis (price ranges and shadow prices) and maximum errror of solution.

LP-Disk runs on any microcomputer with CP/M, one disk drive and 48K of memory, or the Models I and III with one disk drive and 32K memory. Priced at $149.95 for the Model I and III versions and $199.95 for the CP/M version, it is available from Agricultural Software Consultants, 1706 Santa Fe, Kingsville, TX 78363, (512) 595-1937.

Reader Service ↙ 571

Value Line Averages Data

A 20-year record of the Value Line Stock Market Averages is now available on disks from D.B. Management Inc. With this data you can research your hedge or speculative trading strategy in preparation for trading the newest futures market innovation: the Kansas City board of Trade stock index futures contract (KCBT-VLA).

The package includes the Value Line Composite, Industrials, Rails, and Utilities Averages. Weekly closing averages are available from June 31, 1961 to the present for $35 while daily closing averages date from January 1, 1975 to the present and are priced at $65. If you purchase both data sets the price is $95. The daily KCBT-VLA futures prices are also recorded beginning with the opening day and are available free of charge with the purchase of any of the above.

The historical data base is compatible with the Models I, II and III. For additional information contact D.B. Management Inc., 16407 Evans Ave., South Holland, IL 60473, (312) 596-5755.

Reader Service ↙ 595

Conductive Floor Mat

The 9453 Static Control Floor Mat from 3M provides effective static control in locations where electronic systems are in use. It prevents time end money losses caused by equipment outages or data errors.

The earth-tone brown mat, which complements most office decorating

BORN TO RUN

Get your TRS-80™ up and running with special system & disk drive values like these . . .

Complete TRS-80 Model III microcomputer system with disk drives

A.M. Electronics Model III with 48K RAM, two Tandon 40-track double-density disk drives, A.M. Electronics controller board, DOS and manuals, complete and ready-to-run! $1895.00

Prepaid shipping when order is pre-paid.

A.M. Electronics "Multiplier"

Tired of unreliable double density operation? With Multiplier, you can upgrade from a single-density without doubling your problems $99.95

Your Choice:
Teac or Tandon 5¼-inch disk drives, complete!

40-track single side disk drive with power supply, case and extender cables $250.00

80-track single side disk drive with power supply, case and extender cables $340.00

Memory Chips

16K 200 nanosecond RAM chips ..... $2.00 each

New! Teac double-head 5¼-inch 40-track disk drive!

Complete with power supply, case and extender cables $340.00

New! Tandon "Thinline" 8-inch disk drive, complete!

For TR5-80 Model II, complete with dual case, power supply, and cables $695.00

New! Hard disk drives for Model III — Ready to plug in and run!

6.5 Megabyte drive $1995.00
9 Megabyte drive $2195.00
14 Megabyte drive $2395.00
(DOS extra)

TR5-80 Model III Commented

The definitive guidebook to Model III ROM . $15.00

Shipping costs additional except where otherwise noted.

The power behind the drives®

A.M. ELECTRONICS

✓38

Ann Arbor: 3446 Washtenaw Ave., Ann Arbor, MI 48104 (313) 973-2312
Open M-F 10-6, Sat. 10-5. Telex: 220-821-HPC
Fowlerville*: 111 North Grand, Box 1071, Fowlerville, MI 48836 (517) 223-7281
Attention Dealers, OEM's & Distributors: Call us for details on our attractive pricing.

*Authorized Radio Shack Dealer ™TRS-80 trademark Tandy Corp. Prices subject to change without notice

schemes, measures 4 by 5 feet and has a 30-inch lip to project under a desk or work station. Non-skid fastening strips on its back surface eliminate movement and curling. The mat has a 15-foot grounding cord to firmly connect it to a reliable ground.

The mat sells for $310. For additional information contact 3M, Department DR82-3, Box 33600, St. Paul, MN 55133.

Reader Service ↙ 592

New TRS-80 Compiler

Britain's Southern Software has just released Accel3, their latest Basic compiler for the Models I and III. Accel3 has the highest compatibility with source Basic and handles unstructured For...Next loops and arrays with adjustable bounds. It features quicker compilation and more compact compiled code (typically 10–35 percent larger than Basic source) than its predecessor Accel2. Priced at $99.95 ($50 to Accel2 owners) it is available from ALGORIX Software, Box 11721, San Francisco, CA 94101, (415) 387-3131.

Reader Service ↙ 558

New Information Providers

Two new information providers are now available on the CompuServe Information Service: Money Market Services and Small Business Reports.

Money Market Services, a corporation specializing in financial and economic research, uses weekly Federal Reserve data to forecast interest rate trends and their effect on the stocks, bonds, and commodities markets. A library of the firm's weekly financial newsletters is also available through CompuServe.

Small Business Reports provides current information on capital investment and savings plans, tax laws, insurance tips and services available to aid operators of small businesses.

Information from these new sources can be accessed for the standard fee of $5 per hour. For more information contact CompuServe, 5000 Arlington Centre Blvd., Columbus, OH 43220, (614) 457-8600.

Reader Service ↙ 559

System Savers

System Savers is now a two-program package for the Model III consisting of FLEXL and TDISK. FLEXL allows making backup copies of standard system format tapes. Disk owners can use TDISK to save system format tapes onto disk; TDISK even loads non-contiguous tapes. System Savers will not copy protected tapes.

Priced at $19.95 for Model I and III 16K cassette, it is available from Acorn Software Products Inc., 634 North Carolina Ave., S.E., Washington, DC 20003, (202) 544-4259.

Reader Service ↙ 560

Home Handy Hints

Home Handy Hints teaches you 50 ways to save time and money in areas such as energy costs, cooking, cleaning, childcare, and home maintenance. It is available for the Models I or III and requires at least 18K RAM. Priced at $13.83 (add $1 postage) for cassette, it is available from Nancy Modney, 4144 N. Via Villas, Tucson, AZ 85719, (602) 293-5186.

Starter Kit

The computer user's Starter Kit fills the start-up needs of 5½-inch and 8-inch disk users. Packed in a reusable box are a library case for disk storage, a head-cleaning disk with cleaning solution, disk labels, write protect labels, backup and archive labels, and mylar hub rings.

The kit also includes six plastic hard-copy binding posts and a nail clipper for trimming the posts, two floppy-disk writer pens, a No Smoking decal, lint-free cleaning cloth, six plastic wire ties, and two moist towelettes.

Priced at $29.95 for either the 5¼-inch or the 8-inch version, it is available from Ico-Rally Corp., 2575 East Bayshore Road, Palo Alto, CA 94303, (415) 856-9900.

Reader Service ↙ 579

Trade 80

Trade 80, a computer bulletin board system (CBBS) program, features chat mode, personal and general message sections, a local feature section supporting uploading and downloading, and a library section filled with programming tips and reviews.

It is written completely in Basic and is structured so anyone can make changes. It is available for the Models I or III with or without host. It runs under DOSPLUS or NEWDOS80 and can be modified to run under other operating systems.

Priced at $150 with host and $125 without host, it is available from Joe Agrella, 1226 N.W. Fourth Ave., Fort Lauderdale, FL 33311, (305) 525-1192.

Reader Service ↙ 593

MicroBev

The MicroBev Distribution System is a turnkey computer system designed strictly for small beer and soft-drink distributors. The software is designed for the Model II and runs on the TRSDOS operating system. MicroBev is written in Basic

Computer-user's starter kit

Level IV Products Is Expanding Again!

3 Locations To Serve You...

HEADQUARTERS	COMPUTER CENTER	R/S STORE SP-130
22428 SCHOOLCRAFT ROAD LIVONIA, MICHIGAN 48150 (313) 525-6200	182 NORTH 20th STREET BATTLE CREEK, MICHIGAN 49015 (616) 963-2212	136 SOUTH FRONT STREET ROMEOVILLE, MICHIGAN 99097 (616) 752-6600
(MAIL ORDER, WHOLESALE, SERVICE)	(DISCOUNT COMPUTER BOOK BOOK)	(FULL R/S PRODUCT LINES AT DISCOUNT)

PUT A PROFESSIONAL TEAM TO WORK FOR YOU, WE OFFER "IN-HOUSE" TECHNICAL SERVICE, AND A PROGRAMMING STAFF TO ASSIST YOU WHEN HARDWARE OR SOFTWARE HELP IS NEEDED.

WE CARRY OVER 900 HARDWARE AND SOFTWARE ITEMS, MOST IN STOCK. IF YOU DON'T CHECK OUR PRICES AND DELIVERIES, YOU MAY FIND THAT YOU PAID MORE AND WAITED LONGER.

THE PURCHASING POWER OF $2,000,000.00 PLUS SALES INSURES YOU THE VERY BEST OF DISCOUNTS, AND PRODUCT QUALITY. WE DON'T HAVE TO "CUT CORNERS" IN OUR SELECTION OF OFFERINGS, OR CONSTRUCTION COMPONENTS.

WE SERVICE EVERYTHING WE SELL, WE'LL ALSO SERVICE YOUR MODIFIED EQUIPMENT (PROVIDED DOCUMENTATION IS AVAILABLE), AT REASONABLE SERVICE RATES.

TYPICAL PRICES (PARTIAL LISTING)

TRS-80 MODEL III ANS (2) M.P.I. OR TANDON 40 TRACK DRIVES.....(FULLY R/S COMPATIBLE).....		$1799.00
TRS-80 COLOR COMPUTER 16k EXTENDED BASIC.....		$ 449.00
TRS-80 MODEL II 64k.....		$3249.00
COLOR DRIVE 0 ASSEMBLY.....		$ 459.00
M.P.I. OR TANDON DRIVES FOR COLOR, MOD I, MOD III, RAM (FROM $199.00) COMPLETE (FROM $259.00).....		$ CALL
M.P.I. OR TANDON 8" DRIVES FOR MOD II, MOD 16, RAM (FROM $499.00) COMPLETE (FROM $659.00).....		$ CALL
PRINTERS, R/S, EPSON, CITOH, RICOLINE, & OTHERS.....		$ CALL
WINCHESTER DRIVES FOR MOD III, 5.4 meg, COMPLETE WITH BOS & INTERFACE, PLUG IT IN AND RUN.....		$1999.00
WINCHESTER DRIVES FOR MOD III, 14.0 meg, COMPLETE AS ABOVE.....		$2399.00
TRS-80*MODEL 16, 128k, 2Mak, 256k, 512k, SINGLE & DUAL DRIVES.....		$ CALL
UPGRADE YOUR PRESENT SYSTEM, (7 TECHNICIANS ON STAFF FOR PROMPT RELIABLE SERVICE).....	(CALL FOR A QUOTE).....	$ 529/HOUR
ALL POPULAR R/S AND OTHER SOFTWARE AT COMPARABLE DISCOUNT PRICES.....		$ CALL

WARRANTY POLICY:

TO HAVE THE R/S NO DEV WARRANTY IN EFFECT, REQUIRES CONSTRUCTION FROM R/S SUPPLIED COMPONENTS, AT SLIGHTLY HIGHER PRICES.

EQUIPMENT CONSTRUCTED WITH COMPONENTS PURCHASED DIRECTLY FROM THE MANUFACTURER IS COVERED BY A SIX MONTH PARTS AND LABOR WARRANTY BY LEVEL IV PRODUCTS, INC.

YOU MUST SPECIFY WHEN ORDERING TO ASSURE THE LEVEL OF COVERAGE YOU REQUIRE.

TERMS OF SALE:

A 3% DISCOUNT IS ALLOWED ON CASH PRE-PAID ORDERS, PERSONAL CHECKS REQUIRE 2 WEEKS FOR BANK CLEARANCE.

VISA, MASTER CHARGE, C.O.D., AND WIRE TRANSFERS ARE ACCEPTABLE, DEPOSITS ARE REQUIRED FOR ALL SPECIAL ORDER AND ASSEMBLED ITEMS.

A CHARGE OF $10.00 WILL BE MADE FOR ALL RETURNED CHECKS.

SHIPPING:

FOREIGN ORDERS AND LARGE ITEMS ARE SHIPPED BEST-WAY FREIGHT COLLECT, MOST OTHERS ARE SHIPPED PROMPTLY FROM STOCK VIA U.P.S.

DOMESTIC SHIPMENTS OF ITEMS IN THE U.P.S. SIZE AND WEIGHT RANGE YOU MAY ADD 1.5% OF THE ORDER VALUE TO COVER CHARGES FOR SHIPPING, HANDLING, AND INSURANCE. (MINIMUM IS $2.50)

ADD $1.00 FOR ALL C.O.D. SHIPMENTS.

DEALER'S NOTE: Some key areas are still available for both re-sale and servicing dealerships, contact our Headquarters Division for Details.

TOLL FREE ORDER HOT LINE
800-521-3305

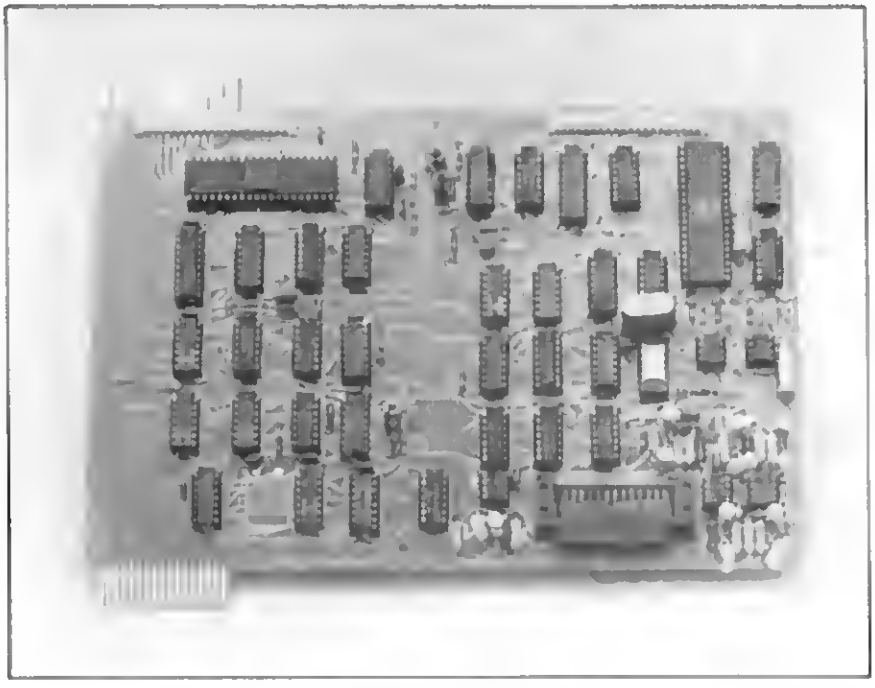
HARDWARE/SOFTWARE Service Line
313 / 525-6200

Your One Stop Computer Shopping Center

*TRADEMARK OF RADIO SHACK, A DIVISION OF TANDY CORPORATION

See List of Advertisers on page 338

NEW PRODUCTS



MDX-3 interface expansion board

end handles volumes of data using an assembler ISAM file eccess to speed up processing.

The system includes inventory control, invoice processing, purchase order preparation, customer control, and route processing.

For additional information contact Microcon Digital Systems Inc., 126 West Walnut St., Kokomo, IN 46901, (317) 457-6623.

Reader Service ↙ 556

Relocator to the Rescue

Now you can use those mechine-language utilities you bought for your 16K machine on your upgraded 48K machine. Relocator rewrites and moves your existing machine-language programs so they use the memory locations you want them to use. Relocator will relocate itself to fit whatever memory you have from 16K up and combines several conflicting programs into one coordinated convenient module.

Priced at $16.95 for Level II tape systems, or $19.95 for disk systems it is available from Micro Pro Systems, Route 2 Box 533, Cumming, GA 30130, (404) 887-6814. Please include $2 for shipping.

Reader Service ↙ 580

Model III Expansion Board

The MDX-3 Interface Expansion Board mounts inside the Model III. It provides a dual density floppy disk controller and data separator, a 20ma and RS-232 serial port and a 300 baud direct-connect phone modem. The MDX-3 board is sold in kit form ($74.94) or as a finished product ($324.95). The User's Manual includes sections on board construction, circuit description, design overview and also includes data sheets on the MOS devices used.

For more information contact Micro-Design, P.O. Box 748, Manchaca, TX 78652.

Reader Service ↙ 584

Labor Distribution Module

International Micro Systems has expanded its payroll system, with a Labor Distribution module. Users can now assign an employee's salary or wage to as many as 30 different departments with each assignment made at differing rates. Complete reports are available by account or employee.

The IMS Payroll System allows small to medium sized businesses and accounting service bureaus to print payroll checks and registers as well as 941A and W-2 forms while keeping track of vecation and sick time for each employee.

The System permits up to eight user-definable deductions in addition to state and federal deductions. Posting is automatic to General Ledger, Job Accounting, or Fund Accounting systems available from IMS.

The Labor Distribution module features hard disk compatibility, a terminal configuration program, a fast machine language sort/merge utility, operator control through convenient screen menus, and full documentation.

IMS software requires CP/M or MP/M, CBasic II, 64K of memory, and a minimum of two disk drives of 500K per drive. For more information contact International Micro Systems, 6445 Metcelf, Shawnee Mission, KS 66202, (913) 677-1137.

Reader Service ↙ 561

Morse Code Communications

The Morse Code Communications program for the Models I and III provides the means to send and receive morse code. You can use it on the air or as an effective morse code instructor. The program generates perfect code at up to 40 wpm and can copy signals at over 100 wpm. Copy is obtained even when the speed varies up to 24 percent. Messages and CQs may be sent in response to a single key stroke.

The program uses cassette I/O and requires at least 16K of memory. It is available on cassette with a nine-page instruction booklet for $19.95 from ROGO Computer Products, 4752 DeBeers Drive, El Paso, TX 79924.

Reader Service ↙ 569

Graftrax-Plus

Graftrax-Plus, an advanced graphics capability for the Epson MX series of printers, is now standard in the MX series and is also available as retrofittable PROMs. The new graphics function offers a total of 66 different type fonts, including italics, subscript and superscript for small print and scientific notation, and international symbols for most Western languages. Greftrax-Plus can also underscore with one pass of the printhead instead of two.

Other features of Grattrax-Plus include programmable form length, horizontal tab

Circle 240 on Reader Service card.→

Freedom Technology International

ANNOUNCES

BigScreen

80 X 24 Video Display

for your TRS-80

From the company that brought you

CP/M Compatibility Plus 64K RAM

Freedom Option

CP/M Compatibility for your TRS-80 Model I and III, PMC 80 and 81, and LNW 80 systems.

Freedom Plus

CP/M Compatibility Plus 64K RAM for your TRS-80 Model I and III.

TWO SYSTEMS IN ONE
Run CP/M application programs in addition to TRSDOS

INDUSTRY STANDARD
Enter the world of powerful CP/M application programs; WordStar, dBase II, etc.

OPEN AND SHUT CASE
EASY to install, plug-in boards; no wires or traces to cut; no soldering.

TECHNICAL BACKGROUND
Over 50 years of high technology experience...from Maxi's to Micro's...both Hardware and Software.

FREEDOM OF CHOICE
T&OS (our powerful Z-80 code operating system) and CP/M 2.2 if you choose.

- Dealer Inquiries Invited
- Six Month Warranty
- 30 Day Money Back Guarantee

MANUAL $25.00

Call us for information about our large selection of CP/M application programs.

SEE YOUR LOCAL DEALER OR CALL TOLL FREE

1-800-523-4067

In Pennsylvania call

(215) 569-2381

TRS-80 is a registered trademark of Tandy Corp
LNW-80 is a registered trademark of LNW Research Corporation
PMC 80,81 is a registered trademark of Personal Microcomputer Inc.
TRSDOS is a registered trademark of Tandy Corp
CP/M is a registered trademark of Digital Research Inc.
WordStar is a registered trademark of MicroPro Int Corp
dBase II is a registered trademark of Ashton Tate

Freedom Technology International

119 North 18th Street, Philadelphia, PA 19103

and right margin, software printer reset, and true backspace. The function also produces high-resolution, bit-image graphics, with up to 120 dpi available horizontally, and 216 dpi available vertically.

For more information contact Epson America, 3415 Kashiwa St., Torrance, CA 90505, (213) 539-9140.

Reader Service ✓ 572

Ghost Gobbler

Ghost Gobbler is a maze-type game for the Color Computer. Four relentless ghosts intent on your destruction chase you around a maze. If you can make it to a power dot, the monsters turn blue and become edible. Then you can gobble the ghosts, but watch out, they flash on and off before becoming poisonous again. Eight different bonus shapes are available ranging in value from 100 to 500 points. Sixteen different skill levels provide hours of fun and enjoyment for the entire family.

Ghost Gobbler is written in machine language for fast action and features high-resolution graphics and sound. It requires 16K of RAM and joysticks. Priced at $21.95, it is available from Spectral Associates, 141 Harvard Ave., Tacoma, WA 98466, (206) 565-8483.

Reader Service ✓ 575

Enumerator Line-Numbers Text Files

Enumerator automatically line-numbers text files created with MicroPro's WordStar. Line-numbered text aids proofreaders in pinpointing an author's typographical errors. By citing page and line numbers, rather than citing page, paragraph and line designations, a proofreader saves time and reduces the chance for compounding errors.

Enumerator offers users the opportunity to format every aspect of output. It also creates a new line-numbered file without changing or deleting the original file and allows lost, unnumbered text files to be restored from the numbered file. The menu-driven program automatically scrolls text onto the screen, allowing you to see what is being done and to quickly abort the program in the event of instruction error.

Enumerator is available on an 8-inch CP/M-formatted disk for $40. For further information contact The Orthocode Corporation, P.O. Box 6191, Albany, CA 94706.

Reader Service ✓ 577

Scott Adams Adventures For CP/M Users

Now CP/M users can enjoy Scott Adams Adventures.

Adventure International is now marketing all 12 of the adventures on a single-density, soft-sectored, 8-inch disk, compatible with any Z80 based computer running under CP/M.

Priced at $129.95, it is available from Adventure International, Dept. G, Box 3435, Longwood, FL 32750, (305) 862-6917.

Reader Service ✓ 576

Sixteen Focuses On Model 16

Sixteen is a new publication devoted exclusively to the new TRS-80 Model 16 microcomputer.

Sixteen will provide hints, tips, product reviews, program listings and general news and assistance. It will sell for an introductory price of $25 in the United States, $32 in Canada and Mexico. For ordering information contact *Sixteen*, 5803 Timber Ridge Drive, P.O. Box 209, Prospect, KY 40059, (502) 228-4492.

Reader Service ✓ 578

Report Writer

DeZoysa Enterprises' line-oriented word processor for the Models I and III permits up to 300 lines of text. It automatically stores text lines on disk and makes them available for subsequent use. It features six editing codes and 12 menu options (all on screen).

The program displays any part of text for review or correction. You can insert or remove lines of text, save all or part of text under different file names, append different text files to the one currently in the computer's memory, print all or part of the text, and print mailing labels for both sender and recipient in the case of a letter. A direct keyboard to printer output feature converts the keyboard to an electric typewriter. Unique on screen identification of uppercase letters for unmodified Model I keyboards is also featured.

The program is totally menu-driven and crash proof. It requires one disk drive, TRSDOS and 32K. Supplied on cassette only with instructions for easy transfer to disk, it is priced at $17.50 and is available from DeZoysa Enterprises, P.O. Box 170, Keyport, NJ 07735.

Reader Service ✓ 583

Software Evaluator's Guide

The *Evaluator's Guide for Microcomputer-Based Instructional Packages* includes a summary of MicroSIFT's evaluation process, glossary, a detailed explanation of all review components, two copies of the review form and sample reviews.

Preservice and Inservice students, practitioners, software developers and users of software reviews will find it useful. Software authors can refer to it as they set their standards of quality. Adoption committees can follow it as they develop courseware recommendations. Professors of education can use the guide as their classes discuss advantages and limitations of typical instructional software packages.

Priced at $2.50 (US) prepaid, the guide is available from the International Council for Computers in Education, Department of Computer and Information Science, University of Oregon, Eugene, OR 97403, (503) 686-4414.

Reader Service ✓ 582

Dual Processor Option For the Model II

The 8086 Dual Processor Option (DPO) for the Model II transforms the Model II from an 8-bit to a 16-bit microcomputer. This unique dual-processor option allows the Model II to run the CP/M-86 operating system from Digital Research and MS-DOS from Microsoft, making available thousands of additional applications.

The DPO board comes with standard memory of 128K. This can be upgraded to 256K.

The Z80 microprocessor that is standard on the Model II is used as an I/O processor and all Z80 compatible software can still run using CP/M-80 and TRSDOS operating systems.

The 8086 Dual Processor Option resides in one slot in the TRS-80 motherboard. For more information contact Veritas Technology Inc., 2375 Zanker Road, Suite 245, San Jose, CA 95131, (408) 283-0646.

Reader Service ✓ 586

HOW TO USE YOUR EPSON WITHOUT WASTING COMPUTER TIME:

Your computer is capable of sending data at thousands of characters per second but the Epson can only print 80 characters per second.

This means your computer is forced to wait for the printer to finish one line before it can send the next. A waste of valuable time.

THE NEW MICROBUFFER™ ACCEPTS DATA AS FAST AS YOUR COMPUTER CAN SEND IT.

Microbuffer stores the data in its own memory buffer and then takes control of the printer. This frees your computer for more productive functions.

PARALLEL OR SERIAL.

Microbuffer model MBP-16K is a Centronics-compatible parallel interface with 16,384 bytes of on-board RAM for data buffering.

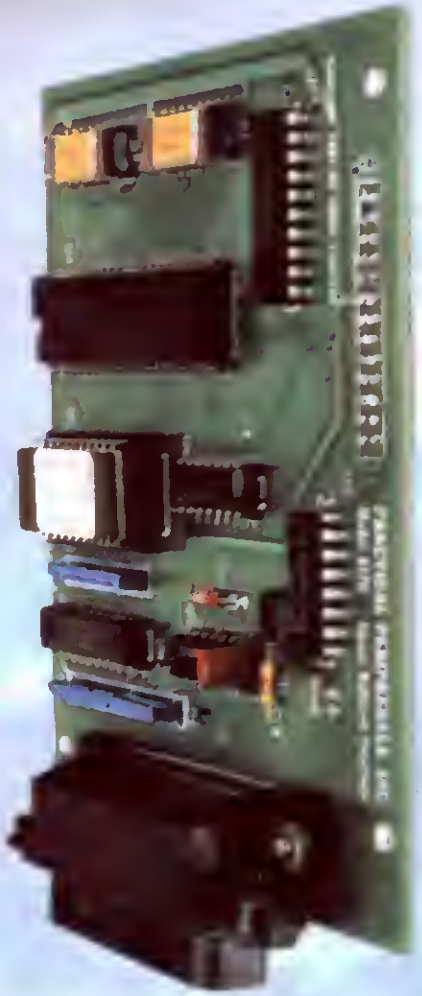
The MBS-8K is a full-featured RS-232C serial interface with both hardware and software (X-On/X-Off) handshaking, baud rates from 300 to 19,000 and an 8,192 byte RAM buffer.

SIMPLY PLUG IT IN.

Either model fits the existing auxiliary interface connector inside the Epson MX-80, MX-80 F/T or MX-100 without modification, and is compatible with standard Epson cables and printer control software, including GRAFTRAX-80.

JUST $159.00*

When you think how much time Microbuffer will save, can you afford *not* to have one? Call us for your nearest dealer.

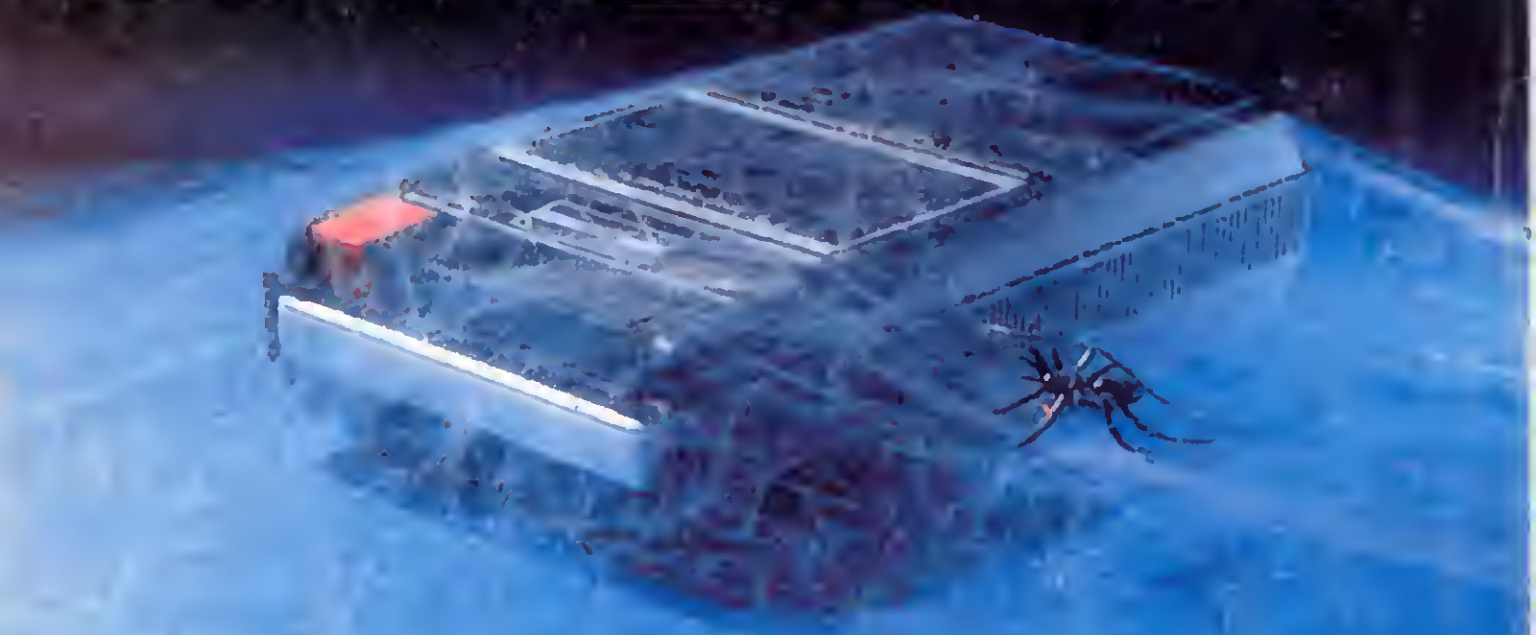


PRACTICAL PERIPHERALS, INC.

31245 LA BAYA DRIVE, WESTLAKE VILLAGE, CA 91362 • (213) 991-8200

*Suggested retail price for either model.

TIRED OF WAITING?



Frustrating isn't it! No matter how much you speed up your program it still seems to take forever to save data onto a cassette. Wouldn't it be great if someone could design a mass storage system with the speed of a disk, but at half the cost? *Exatron* did, the *Exatron Stringy Floppy (ESF)*.

Totally self-contained, the ESF is an extremely fast, reliable, and economical alternative to cassette or disk storage of programs or data. All of the ESF's operations are under the computer's control, with no buttons, switches, knobs or levers to adjust or forget.

The ESF uses a miniature tape cartridge, about the size of a business card, called a wafer. The transport mechanism uses a direct drive motor with only one moving part. Designed to read and write digital data only, the ESF suffers from none of the drawbacks of cassettes - without the expense of disks.

Several versions of the ESF are available, for the *TRS-80* and an *RS 232* unit. Even the slowest of the units is 15 times faster than a cassette, and all are as reliable as disk drives—in fact a lot of users say they are *more* reliable!

excellence in electronics

exatron

To get further information about the ESF give Exatron a call on their Hot Line *800-538 8559* (inside California 408 737 7111).

If you can't wait any longer then take advantage of their 30 day money-back guarantee, you've nothing to lose but time!

181 Commercial Street
Sunnyvale, CA 94086

TRS-80, Apple and PET are trademarks of Tandy, Apple and [illegible]